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AND THE RECORDING OF

AMERICAN AND OTHER PATENTED INVENTIONS.

MAY, 1834.

Information to Inventors who wish to obtain Patents in England.
By the Editor.

Inquiries are frequently made of the Editor, by persons who wish to secure patents in England and France for their inventions, and it has been his design to give some general information upon that subject in the Journal. The present article, however, is not considered as fulfilling this intention, but merely as bringing to notice one point of considerable importance in the business. The patent law of the United States provides for the granting of patents to inventors, only, or to their heirs, administrators, or assignees; and a patent obtained by any other person, is invalid. In England, patents are granted for what is *new there*, without regard to who was the inventor of it; if invented in a foreign country, the term new, applying to its novelty in the realm. Whoever, therefore, first takes a new invention to that country, can obtain a patent, and defend his right. It consequently becomes a point of great importance, that those inventions which are deemed worth the expense of an English patent should not be divulged here before steps have been taken to secure the right on the other side of the Atlantic.

The Editor has, in several instances, prepared and transmitted the requisite papers to England, his situation being such as to offer special facilities for so doing. Owing to this, and to his general pursuits, he has become the depository of more information respecting the modes of procedure than has fallen to the lot of most other persons; his

connexion with the Patent Office of the United States, also, brought to his notice many things calculated to throw light upon this subject.

There are many persons who make it their special business to visit the United States' Patent Office, that they may be able to turn the inventions of others to their own advantage, either at home or abroad; at home, by making some unimportant change in the form of machines that they see there, and then diffusing them in some part of the Union remote from the residence of the original inventor: abroad, by sending to England and France, accounts of such inventions as they believe will sell in those countries.

This subject has been brought afresh to the notice of the Editor, by a letter received from a correspondent in New York, Wm. Serrell, Esq., Civil Engineer; a gentleman from England, and who was frequently employed there in preparing specifications and drawings for the Patent Office; and who has, in several instances, been engaged by American inventors in the same business. In a letter dated March 3d, in which he mentions this fact, he observes, that, "The short period since my first agency of this kind, and the little publicity I have yet sought, are reasons why the number of these transactions is yet small. Still I have the pleasure to say that late arrivals bring advice from my friend in London, that two of such patents are in progress towards profitable sale; but I regret to add, the same letter states that one patent is likely to be interferred with, if not set aside, through some circumstances that will be fully understood by the annexed extract from the letter itself, which extract I hand you, believing that you may consider it of sufficient importance for insertion in your excellent Journal."

Extract from a Letter dated "London, 14th December, 1833."

"It may be of use to apprize inventors of mechanical improvements in the United States, that it is essential to the security of their interests, if they design to take out patents for their inventions in this country, not to disclose the secret of their inventions in the United States, until they have secured a patent here. There are many ingenious mechanics in the United States in correspondence with their friends in this country, constantly on the watch to sieze any thing new, and likely to be useful, to transmit the particulars to their friends, and thus forestall the rights and interests of the original inventor."

As a commentary upon the foregoing extract, the following fact may be stated. An American had obtained a patent in the United States, and had assigned the right thereto, in England, to a fellow citizen for twenty thousand dollars; the assignee, however, arrived there too late, as some one had obtained the description from the office here, had transmitted it, and obtained a patent.

There is now before the British Parliament a new law to regulate the granting of patents. It passed the House of Commons at the last session, and was read a second time in the House of Lords, but the Lord Chancellor, wishing to examine its details with more care than

was then possible, it was postponed. It will undoubtedly be completed at an early period; when we shall give its provisions, with such other matter respecting foreign patents, as may appear to us important.

Observations on the Explosion of the Boilers of the Steam-boat New England. By Thomas Ewbank, *of New York.*

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

Although the explosion of these boilers is, as I believe, justly attributed to an excessive pressure of steam, there is room to suppose that one remote source of the calamity may be found in the inferior quality of a portion of the copper of which they were formed. The grain or texture exhibited in several parts appeared to me on examination to be very different from that of good malleable copper. In order, however, that its quality may be more fairly tested, I have transmitted to the committee of the Franklin Institute on explosions* specimens taken from different parts of the boiler, that they may be essayed by the apparatus of the Institute adapted to that purpose. Of these specimens No. 1 is from the inside ridge of one of the furnace doors. See *j* in fig. 1 of the cuts attached to the report of the Board of Examiners.† Nos. 2 and 3 are from the joint of the vertical flue, or steam chimney, where it was connected to the horizontal flues. This vertical flue was formed of iron, the oxide of which may be seen on one side of these specimens. This joint was two or three inches above the horizontal flues, or about on a level with the lowest gauge cock. No. 4 is from one of the water legs. No. 5, I took from the outside of one of the boilers, near the centre of its length, and on a level with the top of the arches. No. 6 formed part of the shell or roof. The quality of this appears very bad. No. 7 is similar to No. 5. No. 8 formed part of one of the stays.

It should be observed that as No. 6 is from the roof, or shell, and therefore entirely remote from the influence of the fire in the furnace, or flues, it could not be injured by heat from them. In originally forming this part of the boilers, there could be no necessity for annealing the copper, as is the case in working several of the other parts. The quality of the copper from which this specimen was taken, could not therefore be injured by the makers of the boilers, and any defect in it is not attributable to them.

If the metal had been overheated in the process of its manufacture, as is sometimes the case, its malleability would, in a great measure, have been destroyed, even when in an annealed state, and as it was *hard rolled*, it would of course have been rendered still more brittle. Judging from the appearance of the fractures of several specimens, and especially of those which have broken without previous indentation, such as No. 6, it would seem that the copper was either alloyed, or that its tenacity was injured in manufacturing.

* See minutes of the monthly meeting of the Institute for February of this year, p. 159, vol. xiii.—Com. Pub.

† See this Journal, page 58, vol. xiii.

The ordinances of France relating to steam boilers, make provision for *inferior* copper, used in their construction, by requiring an increased thickness. In those dated July 12, 1828, (Journal of the Franklin Institute, vol. viii. p. 403,) it is said, "If, however, the copper is not of *good quality*, one or two-tenths of the thickness given by the table should be added to the numbers thus found, for the thickness of the boiler." And again, vol. ix. page 40, "And as the tenacities of certain varieties (of copper) may be lower than this, it will be necessary, according to the quality of the copper, to increase the thickness given by the formula by about one or two-tenths of the thickness found."

The qualities of different kinds of copper, as of all other metals, vary considerably, while at the same time it is much more liable than others to be injured in its tenacity by slight excesses of temperature; hence it is of great importance in determining the thickness of the particular plates of which steam boilers are to be formed, first to ascertain their tenacity; this, indeed, is of special importance when different kinds of copper are used. It is understood that the copper of these boilers was not exclusively from one establishment.

But a previous knowledge of the strength of the plates of which a boiler is formed, does not afford *sufficient* security against its rupture: for although we may ascertain from its form and dimensions, and the tenacity of its plates, what degree of pressure it *ought* to sustain, yet this result affords no certain proof what pressure it actually *will* sustain. This discrepancy is owing not only to imperfections in, and different tenacities of, the plates, but also to our not knowing the relative *strength of the seams* where the plates are connected together. This is another reason why every boiler should be proved before being used. The explosion of these boilers is a serious call for legislative regulation on this subject. If further evidence had been required to show the utility of subjecting all steam boilers, used in transporting passengers, to a proof of at least double that of their maximum working pressure, and frequently to repeat this proof, such evidence is furnished by this explosion. It may be safely assumed that had such a law been in force, this calamity had not occurred, and that many explosions preceding this, would have been prevented. This would certainly have been true of the explosion on board of the *Ohio*, for the part ruptured in her boiler did not exceed, in some places, the thickness of paper at the time of the disaster; a circumstance which would unquestionably have been detected by a previous proof.

Mr. Potter, in his testimony in relation to the explosion of the boilers of the New England, says he usually carried from fourteen to seventeen inches of steam, and that the engine was intended to carry from sixteen to eighteen. The safety valve was regulated to blow off at eighteen. The steam, however, with the same weight on the valve, rose to twenty-four, and at the time of the explosion it seems to have been still higher.

These boilers, then, if proved at all, should have been tested with twice the pressure they were intended to carry, viz. twice eighteen pounds; but the result has shown what a perilous undertaking it would

have been to have proved them with twice the pressure of the lowest force mentioned by Mr. Potter, viz. fourteen, except by the water press.

By the English requisition, they would have been subjected to a proof triple their ordinary working pressure; and the thickness of the plates would have been required to be such, that their tenacity should not be injured by the proof. By the French ordinances, a quintuple proof would have been required, for although they allow a triple test for low pressure boilers, these would have been considered high pressure, and subjected to the proof accordingly. [Vol. viii. p. 33, Journal of the Franklin Institute.] It is obvious that had the boilers of the New England been required to undergo either of those proofs, the calamity by which seventeen citizens have perished, had not occurred, for the simple reason, that they could not have sustained the proof, and would consequently have been condemned.

It is true that Mr. Hall says they should have borne fifty pounds to the square inch, if there had been no previous imperfection. This is at least a remarkable assertion, and especially so, coming from an engineer, and given under oath. Whatever may be the facts or reasonings upon which it is predicated, it can scarcely be denied, that it is calculated to deceive the public on an important subject, and one which so frequently involves the loss of human life. Unless Mr. Hall can show a previous defect in the boilers, their rupture at thirty pounds (or probably less,) is a conclusive proof that he is greatly mistaken in his calculations. But while the maker of the boilers believes and testifies that they should have sustained fifty pounds to the square inch, what blame can reasonably be attached to one of his men, for using, while under his employment, little more than half that pressure?

There did not appear to me, after several examinations, any reason to believe the explosion was owing to a deficiency of water. If it had been, the horizontal flues would have shown the fact, but in these there was no sign of having been overheated. Had the temperature of the steam been at any time seriously increased from the same source, the covering of the steam pipes (carpeting) would have exhibited the proof; but this was perfectly sound on both pipes, and on every part of them.

No copper boiler, however good the quality of the metal may be, of the form and dimensions of those of the New England, should be permitted to use steam exceeding fifteen pounds to the square inch: while they continue to do so, they will exemplify, as they have hitherto done, the remarks of an intelligent writer, (vol. ix. p. 352 of this Journal,) who observes, "our boats are on the low pressure *plan*, but they carry from sixteen to twenty-five inches of steam, and this is nothing more nor less than high steam. The shape of our boilers is not calculated to resist such a pressure, and some tremendous accident will sooner or later occur, to spread ruin and death among the crowds who venture themselves within their reach."

Though, then, there is no conclusive reason to suppose that any serious deficiency of water took place in these boilers, there can be little

doubt that it was kept lower at the after ends, than at those in front, in consequence of the steam pipes having been connected with the boilers near the latter. By this arrangement a strong current was established towards the apertures of these pipes. The rush of the steam from the opposite ends of the boilers to escape through them, a distance of fifteen feet, would in some degree carry the water along with it, and thus have a tendency to leave those parts exposed. This effect we know is produced, more or less, by all openings, however small, as gauge cocks, &c.; but in these boilers it was still further increased, in consequence of the rapid consumption of steam by the engine, and the small proportional capacity of the boilers, they having had but twenty-four inches for steam and water room.

From the relative position of the gauge cocks, and the aperture of the steam pipes, in the boilers, it may be questioned whether the cocks could safely be depended on to show the level of the water, while the engine was in motion. The steam pipes of the New England were attached to the steam chimnies or to that part of the boilers embracing them, five feet from the roof of the boilers at their front end; being thus about six feet above the gauge cocks, which were placed almost directly under them. When the engine was in motion both steam and water would rush towards the opening of the steam pipes, and this effect would be greater immediately under those openings where the cocks were placed, than at distant parts of the boilers.

It may, I think, be safely assumed, that when gauge cocks are placed immediately (or nearly so) under the aperture of the steam pipes, they cease to indicate the true level of the fluid, while the engine is going; although they may do so, when it is at rest, and the safety valve closed.

Had cocks been placed on the after ends of these boilers, on the same level as those in front, I am satisfied that water would not have been found on the same level in both. Would not cocks so situated be an additional security in such boilers as those of the New England? and would it not be safer in all boilers, to have the steam pipes connected to them at the end opposite to that to which the gauge cocks are attached?

It is supposed that the rupture of these boilers *commenced* at the after end. Mr. Hall thinks, "in the arches near their connexion with the after end." If we suppose the boilers to have had, on an average, water at the second cock, viz. six inches above the flues, it is conceived, as very possible, to have been (when the engine was going,) as much lower at the after ends, in consequence, as before observed, of the rush of the steam to the front. These remarks, although not designed to establish the opinion above expressed, seem, nevertheless, to confirm it.

Whatever may be said in favour of "the water legs,"* in the construction of these boilers, it is conceived that they are more injurious than useful. Deposites of mud, &c. accumulate in them, which it is often difficult to remove; and, with great deference to the judgment of

* See report before referred to. This Journal vol. xiii. p. 130.

the Board of Examiners, it seems to me, that the thin sheet of water contained in them, and especially in the "middle legs," being imbedded in an intense fire, which in those last mentioned embraced both sides, the water was thereby expelled from them; not "being driven by the *steam* into the upper parts of the boiler," but by the repulsion of the heated metal.

These legs form a modification of the boilers described page 4, vol. x. of the Journal of the Institute, and the effects in both will be the same when thin surfaces are not heated uniformly. A further proof of this effect was lately mentioned to me by a friend from his own personal knowledge. Some years ago, two new boilers, similar to those above alluded to, were placed together on board the steam-boat "Legislator." The feeding pipe was attached to only one of them, a pipe being connected from it to the other; the draught of the furnace of the latter boiler was greater than that of the former, and the consequence was that the fire under it had to be damped, and sometimes taken out, in order to get the water into it.

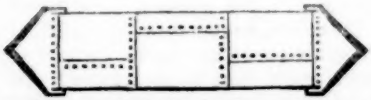
Another circumstance which appears to be worth attending to in all explosions, is the commencement and direction of the rupture, and whether it be in the seams, or in the sheets. In many cases, the relative strength of the seams could thus be ascertained. In the examination of the boilers of the New England nothing satisfactory in these respects could be obtained, the place where the rupture commenced not being known, and the rents being in every imaginable direction. The seams were, however, in numerous instances separated in a line through the centre of the rivets, thus

The joint where the vertical iron flue or chimney was connected to the horizontal flues, was separated chiefly in this manner, and in one place to the extent of three feet. Specimens No. 2 and 3, were from this joint. No. 5 and 7 from the body of the boiler, exhibit the same line of separation.

In the explosion of cylindrical boilers, and especially of those of which the ends are blown out, as the "Atlas," "Car of Commerce," Helen M'Gregor," &c. correct information on the line of separation would have been extremely valuable. The boilers of the above named boats had cast iron ends, when they were blown out. Was it the cast iron of the ends, or the wrought iron of the boilers, which gave way? Was the line of separation in the seam? through its centre, as above, or not? I have often regretted that the highly interesting accounts of Messrs. Halderman, Robinson, Benton, &c.,* did not give us more particulars on this part of the subject. Would it not, in such cases, be desirable to know also the thickness of the boilers at the seam, as well as that of the cast iron ends at the same place, in order to ascertain the comparative strength of each?

* See this Journal, vol. viii. p. 310, and vol. ix. p. 24.

It has been observed that the strength of cast iron ends can be increased indefinitely, but however true this may be with regard to them as separately considered, it does not appear equally so, when they are connected to a boiler. The interior force acting against the ends has a tendency to separate them from the body of the boiler, and the resistance opposed to this, is not so much the strength of the ends themselves, as of that portion of the body of the boiler to which they are united. Supposing them to be one hundred times stronger than the body, still their ability to withstand the pressure of the steam, would depend upon the cohesive force of that portion of the body of the boiler which is left between the rivets which united them to it. As there appears to exist a prejudice against cast iron ends, why not substitute wrought iron *conical* heads in their places? they could be made with greater facility than those of a hemispherical form which are used in Europe, and the metal would not be so much strained as in these latter, nor even as it is where plane ends to boilers are adopted.



In forming a working model of a boiler out of very thin copper, I adopted this figure for the ends, and I am not aware that they could have been made equally strong in any other shape. Had they been made hemispherically the metal would have been strained considerably, especially near the centre, in working it into that form.

Remarks on the Height of the Aurora Borealis, with a review of the accounts of some of the most remarkable Auroral Arches. By James P. Espy.

TO THE COMMITTEE ON PUBLICATIONS.

Gentlemen,—In the Journal of the Franklin Institute for the month of November, 1833, I advanced an hypothesis on the Aurora Borealis, taking for granted that the observations of the Rev. Mr. Farquharson, of Franklin, and Hood, and Parry, and Biot, &c. had put it beyond all doubt that the aurora is formed in the region of the clouds. I find, however, by examining the report of the British Association for the Advancement of Science, to which you refer me in a note, that the author of the able report on meteorology, Mr. Forbes, considers the question of the height of the aurora yet unanswered, and, indeed, leans to the opinion of Mr. Dalton, that the aurora is one hundred miles high. As a doubt still remains on this subject, I propose to state the evidence in favour of Mr. Farquharson's opinion, in so plain a manner, that it will be impossible for any person, who examines the subject, to reject the conclusion that the aurora is in the region of the clouds. And as Mr. Dalton's name alone has great weight, and deservedly too, as he has done so much for meteor-

ology, I shall first examine the data from which he derives his conclusion, that "the aurora is about one hundred miles high."

The paper of Mr. Dalton which I propose to examine, is in the Transactions of the Royal Society for 1828. It is entitled, "On the height of the Aurora Borealis above the surface of the earth, particularly one seen on the 29th of March, 1826."

On this night, an arch of Auroral light was seen at various places from Edinburgh to Warrington and Manchester, one hundred and seventy miles south of Edinburgh, reaching from the horizon north of east to the horizon south of west at various altitudes.

Now, the grand mistake of Mr. Dalton is, that he takes it for granted, that it was one and the same arch which was seen at all these different places. That such was not the fact, will abundantly appear from the following considerations.

The arch was seen to move towards the south at every place of observation where motion was observed at all; at Edinburgh and Jedburgh 20° in fifteen minutes: and yet to many places south of Edinburgh, as at Jedburgh 48 miles, at Hawick 49½ miles, Keswick 90, and Lancaster 119, south of Edinburgh, the arch crossed the zenith before it did at Edinburgh, and, with the exception of Keswick, soonest of all at Lancaster, the most southern point. Kirkby Stephen, about 88 miles south of Edinburgh, and only three or four north of Kendal, in the direction of the arch, is the only place where the arch passed the zenith later than at Edinburgh. Now this proves that there must have been more than one arch; indeed, the one seen at Jedburgh could not have been the same as the one seen at Edinburgh, for at the same time that the Edinburgh arch was twenty-four or five degrees south of the zenith, the arch at Jedburgh appeared fifty degrees south of the zenith, which could not possibly be if there was but one arch. Mr. Dalton was aware of this, and supposed there must have been some mistake in the observations of these two places; but the observations of Jedburgh are confirmed by those of Hawick, which is very near Jedburgh, and as the stars through which the arch at Hawick passed are given, it is found by examining the celestial globe that they are very nearly correct.

As these two places are very near each other, there can be no doubt that the same arch was seen at both. I have therefore been particularly desirous to ascertain their exact position. Now according to several maps which I have examined for that purpose, I find that Jedburgh is something less than two miles, probably a mile and a half north of Hawick in the direction of the arch. I say the *direction*, meaning the general bearing; but I shall show that the bearings were very different, and even in these two places, only about two miles apart, the bearings were very different; the bearing of the arch in the eastern horizon, at Jedburgh, being the same as that at Hawick, and 23° further from the south in the west. Mr. Dalton makes Hawick north of Jedburgh, as it relates to the bearing of the arch; but both from the observations of the arch and from the examination of the maps, I am inclined to think that it is to the south of it. Now an arch must be very low—certainly not more than three or four miles high,

which has such different bearings at two places, not more than ten miles from each other.

If I rightly understand the account given by Mr. Dalton, the arch at Jedburgh at its greatest southern advancement was forty degrees from the horizon, and the one at Hawick was twenty-three degrees higher.

Now if we make no allowance for the bend in the arch, and if Jedburgh is actually about one mile and a half north of Hawick in the direction of the arch, the height of the arch will come out by calculation between three and four miles. We shall see how this height agrees with other facts, before the termination of this investigation.

Let us first examine what confidence is to be placed in the deduction Mr. Dalton draws from the observations at Whitehaven and Warrington, which were chosen, though, as it seems to me, more exceptionable than several others, as the elevation of the arch at Warrington depended on the mere opinion of the observer—the stars through which it passed at that place not having been marked at the time, which was done at several of the other places. For example, Hawick and Whitehaven—Hawick is a little more than thirty miles north of Whitehaven, in the direction of the arch. At 9 o'clock 8 minutes, I find by examining the stars through which it passed that at Whitehaven it was 24° south of the zenith, and at Hawick it was stationary at 8 o'clock 40 minutes, 37° south of the zenith—which, if it were the same arch, which it certainly was not, would give an elevation of about 55 miles. By proceeding in the same way, I find the observations at Hawick and Keswick make it about thirty-five miles high; at Jedburgh and Kirkby Stephen about forty; Edinburgh and Warrington, 150; Edinburgh and Whitehaven upwards of 500; Keswick and Lancaster, forty miles south of Keswick, make the arch at an infinite distance, for it was in the zenith at both places at eight o'clock; so, likewise, the distance will be more than infinite if we take the observations of Edinburgh and Keswick, Edinburgh and Kirkby Stephen, Edinburgh and Lancaster, and what is still more remarkable Kirkby Stephen and Lancaster; for though Lancaster is about eighteen miles further south than Kirkby Stephen, the arch was in the zenith there first by one hour, and more than a quarter of an hour before it reached the zenith at Edinburgh, a hundred and twenty miles north of it.

Now as all the arches moved south in all places where they have ever been seen to move, in any part of the world, we may infer with the greatest confidence, in connexion with all the other facts, that the arch seen at Kirkby Stephen was not the same as that seen at Lancaster, for it could not be, even if the arch was 100 miles high, unless it moved northward, of which we have no account. These two arches, then, observed at Kirkby Stephen and Lancaster, could not have been eighteen miles apart; how much nearer they were we cannot tell, unless we knew their velocity; and this cannot be ascertained by analogy, for the velocity of the different arches was not the same. The one at Edinburgh moved 20° in fifteen minutes, the one at Jedburgh and Hawick about the same, while the other at Whitehaven moved only from Castor to Pollux, about four degrees in twenty-three

minutes, and the one at Cockermouth remained nearly stationary though near the zenith during the very time that the Jedburgh arch moved from thirty to fifty degrees south. Now though Cockermouth is only about twenty miles south of Jedburgh in the direction of the arch, and yet, from the motion of the arches as seen at these two places, it is manifest, they were different arches. Besides, the arch at Cockermouth appeared more than half an hour before the Jedburgh arch, and was first seen 14° south of the zenith, twenty-five minutes before the Edinburgh arch had an existence, and continued to appear south of the zenith at the very moment when the Edinburgh arch appeared north of the zenith.

It being thus established that there were various arches, we may use the northern lights which appeared at various places near the horizon, to form a probable conclusion as to the height of these arches; for what appeared an arch at one place, must have appeared a northern light to an observer at a proper distance south of it. Now as we have no account of an arch having been seen between Edinburgh and Jedburgh, forty miles south, we have a right to infer, there was none, and this inference is confirmed by the fact, that at Jedburgh and Hawick no northern lights were seen, and from this fact we may infer that the Edinburgh arch could not have been eight miles high, for it would then have appeared ten degrees above the horizon at Jedburgh and Hawick.

Again, at Cockermouth, about thirty miles south of Jedburgh, a few streamers appeared *low* in the horizon; and at Whitehaven and Keswick, about five and eight miles south of Cockermouth, no northern lights were seen. Now, if we suppose that the arch at Jedburgh was the low northern light seen at Cockermouth, and not seen five miles further south, the conclusion forces itself upon us that the Jedburgh arch could not have been more than six miles high, for if it had it would have appeared ten degrees high at Whitehaven, where it did not appear at all.

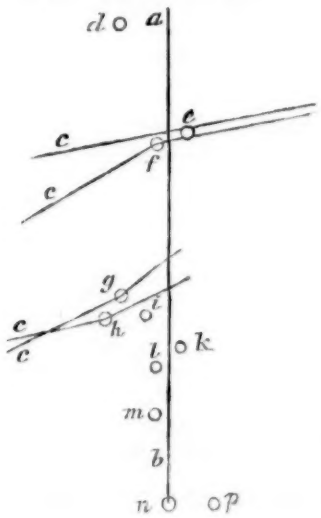
Again, a splendid northern light appeared at Kendal, about twenty miles south of the Whitehaven arch, though none appeared at Kirkby Stephen, eighteen miles to the east, in the direction of the arch, which renders it probable that the Whitehaven arch did not extend as far east as Kirkby Stephen. At Lancaster also, about twenty miles south of the Kendal arch, there was a luminous appearance along the northern horizon; and at Preston, about eighteen miles south of the Lancaster arch, an aurora was seen; but none was seen at Warrington, about thirty-eight miles south of the Lancaster arch. Something of the aurora was seen at Manchester and Doncaster, about fifteen and sixty miles to the east, and four and fourteen to the south, which was no doubt the arch seen at Warrington, sixty-one degrees high. Now it is impossible to conceive that an arch sixty-one degrees from the horizon at Warrington should not be seen at Manchester, only about four miles south, in the direction of the arch, if this arch was one hundred miles high; but if it was only three or four, it might appear an arch at Warrington, and a northern light at Manchester.

Unhappily, the elevation of the northern lights are not generally

given—none, with the exception of Manchester, which was about ten degrees; if we suppose, then, that it was the same light which was seen at Warrington and Manchester, of which there can remain no doubt, the height, by trigonometry, will be found to be less than two miles.

So if we suppose the aurora seen at Preston, eighteen miles south of Lancaster, to be the arch in the zenith of Lancaster, its height will be found about three miles.

Again, at Lancaster, where a luminous appearance was seen along the northern horizon; if we suppose this was the arch seen in the zenith at Kendal, twenty miles north, the arch will be found about three miles high, allowing the luminous appearance at Lancaster to have been seven or eight degrees high. Again, if we suppose "the splendid light in the northern horizon," seen at Kendal, to have been six or seven degrees high, and to have been the same as the Whitehaven arch, seen from fifteen to twenty degrees south of the zenith, the height of the arch will be from two to three miles. Once more, if we suppose the "few streamers seen *low* in the horizon" at Cockermouth, (too low to be seen at all at Whitehaven, only four miles to the south, at right angles to the arch,) to be the very arch which was seen thirty miles to the north of Jedburgh and Hawick, from thirty-seven to fifty degrees south of the zenith, the height of the arch will be about two and a half miles. The same inferences may be drawn as to the height of the arch from the very different bearings at different places, particularly the Jedburgh and Hawick arch, as mentioned before, and the Cockermouth and Whitehaven arch, as will appear by reference to the figure, in which the angles of these arches are carefully laid down by tracing out their directions among the fixed stars on the celestial globe, as they are copied from the original observers by Mr. Dalton.



a b, Meridian, 160 miles.
c c c c, Arches.
d, Edinburgh.
e, Jedburgh.
f, Hawick.
g Cockermouth.
h Whitehaven.
i Keswick.
k Kirkby Stephen.
l Kendal
m Lancaster.
n Warrington.
p Manchester.

It being, however, impossible to calculate the exact height from these bearings, as detailed, I will make no further observations upon them, than simply to say, that the great difference of the bearings at Jedburgh and Hawick alone cannot be accounted for on any supposition, but that the arch was less than five miles high. The correctness of this deduction will not be doubted, when it is recollected that the east and west bearings of all the arches, even those which moved farthest to the south, remained identically the same. For though, near the horizon, they changed their places as to the fixed stars, I have found that it was from the motion of the earth, and not from that of the arches; and this corresponds with all the phenomena of auroral arches which we have on record, as will appear more fully hereafter. The difference of bearing of these two places in the east is very little, while in the west it is twenty-six degrees, if no allowance is made for the difference of time when the observations were taken. But as the Jedburgh observations were made twenty-five minutes before those of Hawick, I find that the apparent motion of the stars will reduce this difference to twenty-one degrees, and actually cause the east bearing of Hawick, and the west bearing of Jedburgh, nine miles east of it, to coincide, while the two west bearings will differ twenty-one degrees. This remarkable fact demonstrates at once the great accuracy of the observers in their details, and the deduction aimed at in this investigation—the lowness of the arch.

I will now proceed to investigate Mr. Cavendish's auroral arch, as detailed in the Transactions of the Royal Society of London, for 1790.

On the 23d of February, 1784, a remarkable stream of light appeared at Cambridge, in England, from about 9 hrs. 5 mins. to 9 hrs. 25 mins., extending entirely across the hemisphere. It rose from the horizon, about ten degress south of west, near δ and γ Ceti; thence ascending in a straight line, inclined a little south to δ and ϵ Tauri, where it made an angle with its former course, and proceeded nearly in a vertical circle over β Aurigæ, η Ursæ Majoris, by Cor. Caroli to Arcturus, setting in the horizon about twenty degrees north of east.

The light was steady, not undulating like aurora, and as it converged to the horizon at each end, had much the appearance that the tail of a comet would have if its nucleus was in the horizon. It was brighter and narrower near the horizon, and its greatest breadth in the zenith was about equal to the distance between the Pointers in Ursa Major.

At Kimbolton, about twenty miles W.N.W. of Cambridge, on the same evening, at 9 hrs. a similar arch appeared eleven degrees south of the zenith; extending from the W.S.W. horizon to the E.N.E.

At the very same moment when the Cambridge arch appeared in the zenith, one appeared at Kensington, about fifty miles south of Cambridge, twenty-four degrees south of the zenith, and continued visible more than twenty-five minutes longer than the Cambridge arch. Now nothing can be more certain than that the Cambridge arch which was seen in the zenith could not be the same as the Ken-

sington arch; for if it were, the latter arch would have appeared north of the zenith, instead of south.

There was an arch also on the same evening at Blockley, about eighty miles a little south of west from Cambridge, which at 8 hrs. 45 min. was fifteen degrees south of the zenith, and disappeared at 9 hrs. 5 min., about twelve minutes sooner than the Cambridge arch, allowing for the difference of longitudes.

These two places being so nearly in the direction of the arch, it is highly probable it was the same arch which was seen at both; and as the Cambridge Observer says that the arch rose from the horizon both in the west and east, and gives the stars beyond which it passed, which I find from the celestial globe are within eleven degrees of the horizon; and particularly as the arch was brightest there, we may safely suppose it was seen at Cambridge within four degrees of the horizon, after it had entirely disappeared at Blockley ten minutes. From this it may be demonstrated that the upper part of the arch could not have been five miles high; for if it had, it would have appeared at Blockley at least fourteen degrees high in the eastern horizon for ten or twelve minutes after it had ceased to be visible there.

It remains now to investigate the Kimbolton and Cambridge observations, to see what reliance may be put on the inference drawn from them by Mr. Cavendish that the arch was about seventy-one miles high. It is true that if a straight line passed horizontally through the zenith at Cambridge, with a bearing eighteen degrees south of west, at the same moment when it appeared eleven degrees south of the zenith at Kimbolton, this line would be seventy-one miles high; for it would pass 12.8 geographical miles from Kimbolton. But there are two circumstances not taken into account by Cavendish, both of which would go to diminish the estimated height of the arch; the bend in the arch as seen at Cambridge, and its motion southward, as mentioned at Blockley. The bend I find by consulting the stars through which the arch passed, was about thirty-five degrees high at Cambridge, forming an angle of twenty degrees with its former direction, and continuing straight in the new direction to the lowest point visible, which was shown before to be probably not more than four or five degrees. Now as the direction of the arch at Kimbolton is expressly stated to be straight from W.S.W. to E.N.E. we are compelled to infer that this bend was not seen at Kimbolton so as to attract notice; yet I find by calculation that if the arch was two and a half miles high, several miles of it must have been seen in common by the observers at Kimbolton and Cambridge. This conclusion is rendered almost certain, from the fact that at Kimbolton "the whole hemisphere was without a cloud."

If, however, we suppose the arch not much above a mile high, none of it would be seen in common by the observers at the two places, except a portion so near the horizon as not materially to affect the bearing at Kimbolton, and not likely to attract attention there.

Again, as the observation at Kimbolton was certainly taken before that at Cambridge, perhaps ten or twelve minutes, and as the motion of the arch was south, some allowance ought to be made for this, but

as the velocity of the arch is unknown, as likewise the exact length of time between the observations, it is impossible to know how much this allowance should be.

From the whole investigation of the Cavendish aurora, two conclusions are certain, that there were two arches seen on the evening of the 23d February, 1784, one at Kensington, and one at Cambridge, and that the arch at Cambridge could not have been two miles high.

[TO BE CONTINUED.]

Notice of a Steam Mill for Extracting Oil from Cotton Seed, at Natchez, Mississippi.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—Observing that one of your correspondents urges upon those interested in the useful application of the large quantities of cotton seed which remain over and above that necessary for planting, the manufacture of oil from the material, and makes some suggestions for improving the processes hitherto employed, I have been induced to send you an extract from a letter containing a brief notice of a steam mill, for expressing the oil from cotton seed, located at Natchez, Mississippi.

Yours, &c.

B.

"The cotton seed is hulled by passing between large cylindrical rollers, resting upon beds of the same figure, into which the rollers fit; it is then bruised by two immense wheels which are dragged over the seed in a circular trough; these wheels do not turn on their axes as they are urged round the bed. After this process, the greasy mass is formed into cakes, and being transferred to holes adapted to receive them, the driving of a wedge into the holes by heavy stampers expresses the oil which is received in appropriate receptacles. The cake is now well dried, and being ground affords excellent food for cattle. The whole of the machinery is driven by steam, the fire to produce which is mainly furnished by the hulls of the cotton seed, being kindled with coal. A suspension rail-way connects the establishment with the landing on the bank of the river."

FRANKLIN INSTITUTE.

Monthly Conversation Meeting.

A Monthly Meeting of the Institute, for conversation, was held at the Hall of the Institute March 27th, 1834, when Mr. Tyler exhibited a ruling machine for ruling straight or waved lines, for plain and perspective ruling, and for medal ruling. This machine was explained and the methods of operating with it shown.

Specimens of the India rubber manufactured articles from the

Roxbury India Rubber Factory, were shown by Mr. George Woodman, of Boston, Massachusetts. The articles exhibited were a pair of ladies' shoes, water proof, a specimen of hose, and belts for machinery, of cloth saturated with the gum elastic, forming a tough and flexible article. The general steps in the manufacture were stated.

Jacob Keim, of Philadelphia, exhibited specimens of the hanging and reading astral lamps, invented by him. The wick is raised so high above the reservoir as to diminish very much the shadow cast by the lamp: the means of procuring this desirable effect are very simple and easily renewed, when, by use, they may have become ineffective.

Benjamin Slater, of Philadelphia, of the firm of Moore and Slater, submitted an ingenious and effective water wheel governor, invented by Nathan Scholfield, of Connecticut.

A transit instrument, made by W. J. Young, of Philadelphia, was explained by Sears C. Walker. The workmanship of this instrument was much commended, and the attempt, which will be followed up, pronounced decidedly successful.

Professor A. D. Bache showed a modification of the fantascope, or revolving disc, by which the mirror is dispensed with, and the distance between the disc and partition made variable to adapt it to near and far sighted persons. He also showed two specimens of the effects produced by the Dœdalum, a philosophic toy, on the same principle with that just referred to, invented and described by the English mathematician Horner. At the same time, the meteorascope of John J. Barker, of Philadelphia, was brought forward, and a method of using it without the mirror described by Prof. Bache, by which the instrument obviously anticipates the invention last exhibited.

REPORT OF THE COMMITTEE ON WEIGHTS AND MEASURES.

APPENDIX TO THE REPORT OF THE COMMITTEE OF THE FRANKLIN INSTITUTE ON WEIGHTS AND MEASURES.

Report of Dr. Samuel Moore on the authentication of the Troy Pound in possession of the Mint of the United States.

To the committee of the Franklin Institute charged with the subject of Weights and Measures.

Mint of the United States, October 1, 1833.

The standard troy pound of the mint is a copy, executed with great care, of the British parliamentary troy pound of 1758, recognised and designated in the year 1824 as the imperial troy pound of Great Britain. It was procured at my request, in 1827, through the attention and influence of Mr. Gallatin, Minister of the United States at London. By the friendly offices of Mr. Davies Gilbert, Vice President of the Royal Society, the standard troy pound in the care of the Clerk of the House of Commons, was, on the application of Mr. Gallatin to the Speaker of the House, committed to the charge of Capt.

Kater, for the purpose of effecting at his own house an adjustment of the copy to the original.

The standard weight is of brass, the original being of that material. It was made by Mr. Bate, who had constructed all the standard British weights, and the comparison with the original was made by a very delicate beam constructed by Robinson, the same artist who had constructed the beam with which Capt. Kater compared the standard weights above mentioned with the original standard troy pound.

The weight was enclosed in a neat casket carefully enveloped under seal of the American legation at London, and committed by Mr. Gallatin himself to the hands of Mr. Cucheval, a public messenger, bearing despatches from the legation to the United States, by whom it was delivered into my hands, accompanied by a packet containing ample certificates from Capt. Kater and Mr. Gallatin, testifying to the accuracy of the weight in question.

The casket and accompanying package were retained under seal, waiting the return of Mr. Adams, President of the U. S., from his family residence to Washington, in order that the seal of Mr. Gallatin, and the various facts of chief moment, in regard to the authentication of the weight, might be verified, on his authority. They were accordingly opened in the presence of Mr. Adams, in Philadelphia, on the 12th of October, 1827, and his full certificate in regard to the seal, which he readily recognised, and to the circumstances generally, giving assurance of the fidelity of the whole transaction, and the consequent accuracy of the weight, has been added to the vouchers in the case; he declaring, in conclusion, his entire belief, that the brass weight then exhibited was the identical copy of the imperial standard troy pound of Great Britain, intended and referred to in the aforesaid certificates.

The above facts having been communicated to Congress through the committee on the mint, the troy pound thus certified was specifically declared by law to be "the standard troy pound of the mint of the United States, according to which the coinage thereof shall be regulated." See section 2nd of the act of May 19, 1827, respecting the mint, a copy of which is hereto annexed.

This is the specific pound weight, assumed as the standard unit of the system of weights reported to the Senate of the United States, under a resolution of that body of 29th May, 1830—see a communication from Mr. Ingham, Secretary of the Treasury, made to the Senate March 3d, 1831; also the report of Mr. Hassler on the subject, 27th January, 1832, pages 10 and 25; and a communication to the Senate from Mr. M'Lane, Secretary of the Treasury, accompanying this report, dated 20th June, 1832. It has been constantly in my possession, and is preserved with the utmost care.

Very respectfully, gentlemen,
Your obedient servant,
SAMUEL MOORE,
Director United States Mint.

Copy of the 2nd section of *An "Act to continue the Mint at the City of Philadelphia, and for other purposes."* Approved 19th May, 1828.

"Sect. 2. And be it further enacted, that, for the purpose of securing a due conformity in weight of the coins of the United States, to the provisions of the ninth section of the act passed the second of April, one thousand seven hundred and ninety-two, entitled 'An act establishing a Mint, and regulating the coins of the United States,' the brass troy pound weight, procured by the Minister of the United States, at London, in the year one thousand eight hundred and twenty-seven, for the use of the mint, and now in the custody of the director thereof, shall be the standard troy pound of the Mint of the United States, conformably to which the coinage thereof shall be regulated."

ACT REGULATING WEIGHTS AND MEASURES IN THE PROVINCE OF PENNSYLVANIA, A. D. 1700.*

An Act for regulating Weights and Measures. (*a*)

Be it enacted, That in each county of this province and territories there shall be had and obtained, within two years after the making of this law, at the charge of each county, to be paid out of the county levies, standards of brass, for weights and measures, according to the King's standards for the exchequer; which standards shall remain with such officer in the counties aforesaid, as shall be from time to time appointed by the Governor, with the advice of the Council: And every weight, according to its scantling, and every measure, as bushels, half-bushels, pecks, gallons, pottles, quarts and pints, shall be made just weights and measures, and marked by him that shall keep the standards. And that no person within this province and territories shall presume to buy or sell by any weights or measures, not sealed or marked in form aforesaid, and made just according to the standards aforesaid, by the officers in whose possession the standards remain, on penalty of forfeiting five shillings to the prosecutor, being convicted by one Justice of the Peace of the unjustness of his weights or measures. And that once a year at least, the said officer, with the Grand Jury, or the major part of

* Extracted from Bioren's edition of the Laws of Pennsylvania. Vols. 1 & 6.

(*a*) This act, except the last section, is confirmed post. chap. 138; and by an act passed on the 19th of January, 1733-34, (post. chap. 382,) millers, bolters and bakers were required to bring their weights and measures, once in three years, to the standard kept in each county, according to the direction of the law in the text: [but that act was repealed on the 5th April, 1781, (post. chap. 925.)

It appears by the records of the executive department, that the late Supreme Executive Council proposed two questions on this act for the opinion of the Attorney-General, (*Mr. Bradford.*) "1st. In whom the appointment of the officer therein mentioned is now vested? and 2d, Whether the Mayor or Cor-

them, and for want of the Grand Jury, with such as shall be allowed and appointed by the respective County Courts aforesaid for assistants, shall try the weights and measures in the counties aforesaid; and those weights and measures as are defective to be seized by the said officer and assistants: Which said officer, for his fees, for making each bushel, half-bushel and peck just measure, and marking the same that is large enough when brought to his hands, shall have ten-pence; and for every lesser measure, three-pence; for every yard, three-pence; for every hundred and half-hundred weight, being made just and marked, three-pence; for every lesser weight, one penny. And if the weights and measures be made just before they be brought to him, then to have but half the fees aforesaid for marking the same. And if the said officer shall refuse to do any thing that is enjoined by this law, for the fees appointed, and be duly convicted thereof, [he] shall forfeit five pounds, to the use of the Proprietary and Governor.*

II. *Provided always, and it is hereby enacted*, That the brass half-bushel, now in the town of Philadelphia, and a bushel and peck proportionable, and all lesser measures and weights coming from England, being duly sealed in London, or other measures agreeable therewith, shall be accounted and allowed to be good by the aforesaid officer, until the said standards shall be had and obtained.

III. *And be it further enacted*, That no person shall sell beer or ale by retail, but by beer measure, according to the standard of England. (*b*)

poration of Philadelphia have a right to appoint such an officer for the city, in exclusion of that appointed by the county?" The opinion of the Attorney-General, dated the 14th of October, 1790, in answer to the first question, states, "that previously to the revolution the power of appointment was clearly in the Governor; and, by the laws and constitution of the state, may now be exercised by *the President and Council:*" And, in answer to the second question, it states, "that the Mayor and Corporation have not any such power of appointment." However, as it seemed doubtful whether there is now in existence any such standards as are directed by the act to be procured, and as the original standard is now kept in a foreign kingdom, a revision of the act was suggested by the Governor to the Legislature, in his address of the 28th day of December, 1790, unless there should speedily be made by the Federal Government some general and permanent provision, which would supersede the necessity of any state regulations. As the constitution of the United States, (art. I. sect. 8,) vests in Congress the power of fixing the standard of weights and measures, and as a general regulation is contemplated by that body, the Legislature of Pennsylvania has not hitherto interposed on the subject. (*Note to former edition.*)

* The word [he] is not contained in the original roll, though inserted in the former edition. (*Note to former edition.*)

(*b*) By an act passed in 1705, (post. chap. 138) any person licensed to keep any tavern, inn, alehouse, or victualling house, shall sell beer and ale by wine measure to all persons who drink it in their houses, and by beer measure to all such persons as carry the same out of their houses, under the penalty of ten shillings, &c. and this act is confirmed, except the third section.

An Act for selling beer and ale by wine-measure.

Whereas by a law of this province, for regulating the dimensions of casks, &c. it is enacted, among other things, That a barrel shall contain thirty-one gallons wine-measure. And whereas by another law of this province, for regulating of weights and measures, it is, amongst other things, enacted, That none shall sell beer or ale by retail, but by beer-measure, according to the standard of England; by reason whereof the retailers of beer and ale are obliged to sell the same by far greater measure than they buy it: For remedy whereof, *Be it enacted*, That from and after the publication of this act, all persons which now are, or which at any time or times hereafter shall be licensed to keep any tavern, inn, ale-house or victualling-house, within this province, shall sell beer and ale by wine-measure to all persons as drink it in their houses, and by beer-measure to all such persons as carry the same out of their houses, under the penalty of ten shillings, to the use of the poor for every county where the offence is committed, any law, custom or usage, to the contrary in any wise notwithstanding.

II. *Provided always, and be it further enacted*, That the above recited law, entitled, *An act for regulating weights and measures*, and every part and proviso therein contained, except the last clause thereof, relating to selling beer and ale by beer-measure, shall be and remain in full force, any thing herein contained to the contrary notwithstanding.

Passed in 1705.—Recorded A. vol. I. page 184.

See ante. (chap. 73,) pa. 19. The act for regulating the dimensions of casks, &c. herein recited, was repealed March 20th, 1810.

A supplement to the act, entitled "An act for regulating Weights and Measures."

Sect. 1. Be it enacted by the Senate and House of Representatives of the commonwealth of Pennsylvania, in general assembly met, and it is hereby enacted by the authority of the same, That if any person or persons shall counterfeit the brands and marks, or either of them, of the sealer of measures in the city and county of Philadelphia, or shall presume to buy or sell by any measure, not sealed, branded or marked, according to the directions of the act to which this is a supplement, or shall alter the size of any vessel with a fraudulent intent, after being sealed, branded or marked by the proper officer, he, she or they, being thereof legally convicted, shall forfeit and pay any sum not exceeding thirty dollars, one half thereof to be paid to the informer, and the other half to the commonwealth.

Sect. 2. And be it further enacted by the authority aforesaid, That if any person or persons shall, within the city and county

aforesaid, presume to sell or offer for sale any dry measure whatever, not sealed, impressed or branded by the sealer of measures, according to law, he, she or they, upon conviction thereof, shall forfeit and pay any sum not exceeding ten dollars, to be appropriated as aforesaid.

Sect. 3. And be it further enacted by the authority aforesaid, That if the said person who may be appointed sealer aforesaid, shall at any time stamp or seal any measure that does not agree with the standard now in force, and being duly convicted thereof, shall forfeit and pay any sum not exceeding ten dollars to the guardians of the poor of the proper ward, township or district, for the support of the poor thereof: or shall refuse or neglect to do any thing enjoined on him, in and by an act, passed in one thousand seven hundred, entitled, "An act for regulating weights and measures," or charge more fees than is directed by said act, and being duly convicted thereof, he shall forfeit and pay any sum not exceeding fifty dollars, one half to the informer, the other for the use of this commonwealth.

Sect. 4. And be it further enacted by the authority aforesaid, That all proceedings for the recovery of penalties incurred in pursuance of this act, shall be proceeded in, and recovered before any alderman or justice of the peace of the proper ward, township, or district, in the same manner, and be subject to like appeal, as debts of the same amount are now recoverable.

Sect. 5. And be it further enacted by the authority aforesaid, That so much of the act to which this is a supplement, as is hereby altered or supplied, is hereby repealed.

Passed 29th March, 1813—Recorded in Law Book No. XIV. p. 105.

Note.*—Grain usually bought and sold by measure to be regulated according to the following standard, viz. the weight of a bushel of wheat to be 60, of rye or corn 58, of barley 47, of buckwheat 48, and of oats 32 pounds.

Foreign salt to be bought and sold by weight per bushel, viz. coarse salt 85, grained salt 70, and fine salt 62 pounds. Nothing in the act to prevent selling or buying by measure, (ch. 4547.)

The bushels for measuring lime in the city and county of Philadelphia, Bucks, Montgomery, Delaware, Chester, Lancaster and York, to be 13½ inches diameter at the bottom, and 15 at the top, and 13 inches and 47-100 perpendicular depth in the clear. The Court of C. P. to appoint persons to procure a brand and make every bushel; his qualifications and duties. Penalty of 5 dollars imposed for using a bushel not stamped, (ch. 4718.)

See vol. 1, p. 18, and notes thereto.

Report in relation to the practice in the sale of Grain, Salt, &c.

The committee appointed to inquire into the practice of selling Grain, Salt, &c. in the city of Philadelphia, and to examine such

* The information contained in this note, renders it unnecessary to reprint the acts referred to. The duties of the sealer and regulator form no part of the subject under consideration by the committee.

of the details of the bill reported to the House of Representatives, as relates to this point, beg leave to state:

That from the best information they are able to obtain, the existing usages, founded on commercial practice, appear to be as follows: Wheat is universally bought and sold by weight, sixty pounds being estimated to be equal to a bushel. Barley is bought by the brewers of Philadelphia, at the rate of forty-eight pounds per bushel. Rye, indian corn, buckwheat and oats are bought and sold by the measured bushel. Salt of all descriptions pays duty at the rate of fifty-six pounds to the bushel, and is in all cases sold by measure. Anthracite coal is sold by weight, twenty-two hundred and forty pounds being allowed for one ton. Bituminous coal is sold by measure, a vessel containing ten pecks being used as a measure, and called two bushels. Beer is sold by the wine gallon of 231 cubical inches, and no other gallon appears to be known in the commerce of Philadelphia for the measurement of liquids, unless the measure used in the sale of milk be an exception, this being stated to be one founded on the standard dry bushel.

The details of the bill, so far as they attempt to define quantities of commodities, ascertained by weight, which shall be deemed and taken to be equal to quantities ascertained by measure, appears to the committee to be obnoxious to objection in every point of view: first, in attempting to make things the same by law, which nature has decreed shall be otherwise; for grain obtained from different soils, and salt manufactured by different processes, will be found to differ in their specific weight, as sensibly as lead and silver differ from each other; and however convenient an assumed weight may be, as a measure of its value in commerce, its introduction into a bill fixing standards of weights and measures, tends, in the opinion of the committee, rather to unsettle than to establish. Secondly, if it be intended to fix by the bill in question the quantities of commodities which shall be taken and allowed to correspond with the standards, it would seem necessary to detail all the articles which are the subject of commerce, and to provide as well for a hogshead of wine as of cider, or for the measurement of sand equally with that of lime, or for lumber as well as wood for fuel.

Your committee would respectfully recommend, that all attempts to regulate the quantities of commodities, which shall be deemed and taken to be equal to the said standards, shall be abandoned, and the regulation of such matters left to the argus eyes of Commerce; or, when necessary, to the execution of the Inspection laws, in which the requisite provisions might be incorporated.

FREDK. FRALEY,
S. C. WALKER, } Committee.

To the Committee on Weights and Measures.

Philadelphia, Jan. 16, 1834.

Report in relation to the Standards of Weights and Measures in the city of Philadelphia.

The committee appointed to examine the standards of weight and of measure in the possession of the regulator and inspector of weights and measures, and of the sealer of dry measures, in the city of Philadelphia, report:

That the standard of measure is a steel yard rounded at the ends by use, and marked with submultiples of the yard by notches, about one thirty-second of an inch in width. This standard is *supposed* to have been brought to the city by William Penn.

The capacity measures in possession of the regulator, as far as liquid measures are concerned, cannot be called standards, they are of sheet copper and much battered; the measures purport to be a gallon and half gallon, date and origin not known. The standard in actual use is a prismatic tin cup, made under the direction of the present regulator, and intended to be one-fourth of the gallon of 231 cubic inches.

The dry measure standards in this office are two, a pint and a quart, made of cast brass, and stamped

The stamp is also upon them.

The standard weights are one of 2 lbs., one of 4 lbs., of 7 lbs., 14 lbs., 28 lbs., and 56 lbs. There are various marks upon them, of which the city of Philadelphia mark is common to all, as well as the mark . The mark is also common to them all, and is presumed to have been a private mark of inspection. The 4 lbs. weight is distinctly marked

; on the 2 lbs. and 28 lbs. the letter is partly obliterated, and may be either G or C; on the 56 lbs. it appears to be

seeming to indicate that the standards have not a common origin. All the weights are *leaded* below. A copy of the 2 lbs. weight, tested at the mint, weighed exactly 14,000 grs. troy, the number of grains in 2 lbs. avoirdupois; a circumstance, which, considering the changes to which the standards have been liable, and the rude means furnished to the regulator for their adjustment, must be considered accidental.

It is due to the regulator, Mr. W. B. Mott, to state that every information was furnished to the committee which was in his possession, and that he appears to have made the most of the means furnished him by the city or state, for carrying into effect the duties of his office.

The standards of dry measures in possession of Mr. Barger, sealer of dry measures, are a copper half bushel, and a bell

metal half peck and quarter peck; the rim of the first named measure is much worn and apparently has been often repaired.

The committee conclude that the city standards are, though traced by legend to Wm. Penn, of different dates and of uncertain origin and authenticity, and that they have been deteriorated by use, and by regulation at different times, since they have been in use as standards.

Respectfully submitted.

ALEX. DALLAS BACHE,
SAML. V. MERRICK,
SAML. MOORE.

Jan. 8, 1834.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN NOVEMBER, 1833.

With Remarks and Exemplifications, by the Editor.

(Continued from page 276.)

21. For *Lubricating the Pistons, Piston Rods, &c., and improvements in other parts of Steam Engines;* Samuel Hall, Bassford, Nottingham county, Great Britain. Granted in pursuance of a special act of Congress, passed March 2nd, 1833. November 19.

(See description among specifications.)

22. *For Preparing Blood to be used for Refining Sugar, and clarifying other articles;* Thomas Hewitt, city of Philadelphia, November 19.

The blood is to be stirred and mixed with animal or vegetable charcoal, about pound for pound. The mixture is then to be submitted to a gentle heat, either natural or artificial, not, however, such as would coagulate it, but only sufficient to drive off the moisture and "Mephitic effluvia." When dry, it is to be reduced to powder by means of a mill, or otherwise.

When this powder is required for use it is to be so far dissolved in water as to have the consistency of thick cream, and then is to be employed as blood is generally used in the refining of sugar.

The claim is to the preparing of blood, *before drying*, by mixing it with animal or vegetable charcoal.

The article intended to be clarified is not blood, but the serum of blood, after the clot, or fibrin, has been separated from it.

There is one part of the patent law which it is not always convenient, or possible, to execute; it is that which requires that specimens of the ingredients used in the thing patented should be deposited when the patent is taken for a *composition of matter.* Bullock's blood could not be very well kept in the patent office; and should any one obtain a patent for a new mode of preparing and mixing "*poudrette,*" specimens of the ingredients would not be desirable.

23. For *Laying the timber work of Rail-roads;* Elisha Johnson, Rochester, Monroe county, New York, November 19.

This patent is for a rail-road, in the construction of which there are to be sleepers of round timber, hewed on one side, or prepared in any other way; they are to be connected by cross timbers three feet apart, upon which are to be placed wooden rails of yellow pine; and iron plates, two by four inches, are to be spiked on to them.

The improvement is said to consist in the form, which combines cheapness of material with simplicity of construction, and increase of strength. Some further advantages are also named, but we are unable to perceive in what way this plan is to secure them, or in what part its novelty is to be found.

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24. For a *Cooking and House Warming Apparatus;* Richard Johnson, Baltimore, November 19.

This contrivance is denominated "The Cook's Relief, and Fuel Saver." We are told how the apparatus is to be formed, but are left to conjecture in what the invention of the patentee consists, and as the business of a critic upon patented machines is not one of a very imaginative character, we "give up" the task of conjecturing to those more practiced than ourselves in the art of guessing.

The fuel is contained in a grate below, which appears to have an open fireplace. Above this is a grating upon which to set boilers, and just above the grating there is an opening in the back plate to serve as a flue. Next comes a plate, or shelf, upon which heavy joints are to be roasted in suitable dishes, and another shelf surmounts this, for roasting, or baking lighter articles. All these shelves are enclosed in an iron oven, or closet, with folding doors, which oven, we are told, may be built into a fireplace, and take no room. An iron tube may cross the fire, and heated air may, if it will, convey heat to the other apartments; and thus endeth the whole history.

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25. For a *Machine for Spinning Tobacco;* Ashton Johnson, Assignee of James Martin, Petersburg, Virginia, November 19.

The claim in this case is to "that arrangement of the kind of spinning apparatus which is commonly used in factories for spinning cotton, wool, and other fibrous materials into thread, whereby it is fitted and applied to the spinning and winding of tobacco upon the spool, as described and represented; and which is distinguished from the ordinary mode of spinning tobacco as entirely as the spinning of yarn upon the vertical spindle, with flyers, is distinguished from common hand spinning upon what is called the big wheel, in which the operator has first to spin the article, and then to lay it upon the spool or spindle."

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26. For a *Machine for Cutting Spun Tobacco;* Ashton Johnson, Assignee of James Martin, Petersburg, Virginia, November 19.

The spun tobacco passes between fluted rollers, which, in turning,

draw it on, and pass it through a short tube; a knife is made to vibrate against the end of this tube, for the purpose of cutting the tobacco into lengths; by varying the size of the pulley around which the band passes in order to vibrate the knife, the lengths into which the spun tobacco is cut, are also varied. The machine is simple, and well adapted to the intended purpose. The claim is to "the general arrangement and operation of the several parts, for the cutting of spun tobacco into determinate lengths."

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27. For a machine for *Cutting Vegetables for Fodder;* William A. Hamilton, Albany, Albany county, New York, November 19.

This machine consists of a cylinder of cast iron, which may be ten inches in diameter, and a foot in length. Two knives pass from end to end of it, on opposite sides, and to such distance from it as shall be equal to the length, or thickness, of the pieces into which the articles are to be cut; for ease of cutting, these knives are placed diagonally. The cylinder is to be turned by a crank, and has a fly wheel on its shaft. Above the cylinder is placed a box, which is to serve as a hopper to receive the roots, straw, or other articles to be cut. This box is rectangular, of a width equal to the length of the cylinder; it has a fixed knife on its lower end, adapted to those on the cylinder; a door closes upon the articles placed in it, and a follower, of such weight as may be necessary, is placed within the box, at the upper end of it, to press down the contained materials; the bar does not stand vertically over the cylinder, but is inclined from the perpendicular.

The amplified description of this apparatus covers about eight pages of manuscript, and although its individual parts are set forth in their due dimensions, with all legal precision, it fails in the most important point, that of telling us what the patentee has invented, or, in the words of the law, "distinguishing the same from all other things before known or used."

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28. For an improvement in the *Mode of making Hoes;* George Harper, Montgomery county, Pennsylvania, November 19.

The specification of this patent is a brief affair, as the whole invention consists in cutting a steel plate, or one of iron and steel, into the proper shape, punching two holes through it, where the handle is to be placed; riveting two straps into these holes, placing the handle between them; and then riveting through the whole, as a spade handle is riveted.

There are several patents for modes of attaching the handles of hoes to steel plates, and although this is the last of the series, it certainly is not the best.

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29. For a *Machine for Making Shingles, Staves, Heading, Siding, and Laths;* Richard Hunt, Carrol, Chataque county, New York, November 19.

There is a general likeness between this machine and some others for the same purpose, but the claim made refers to the particular mode in which the operations are performed by it.

"The riving of the shingles, laths, siding, and staves, in the manner described, and the shaving at one stroke of the machine, a perfect shingle, in the following manner:—The shingle, after being rived, is placed on the plank, moving on the inclined plane, confined at one end by the slip gauge, which moves back and forth with the carriage passing over the shingle, and the knives following immediately after the roller, one shaving passing down through the plank, the other over the roller, and the shingle passing out at the tale of the machine, is claimed as new, and of my own invention."

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30. For a *Washing Machine;* Andrew Glendening, Franklin county, Indiana, November 19.

This is called "the universal band washing machine." The description of it is obscure, the drawing imperfect, and the claim a nullity. We gather from it, however, that a water tight box is to be made, five feet in height, three feet three inches wide, and two feet eight inches deep. In the upper end of this box is to be placed a roller of three feet in length, and two in diameter; another, of four inches diameter is to be placed beneath it, within four inches of the bottom of the box; and the other rollers are to occupy intermediate stations. Three bands, or endless aprons, each in width equal to one-third of the length of the cylinder, are to be passed round them; or, in place of them, one single wide band, or endless apron, may be employed. The clothes to be washed are to be attached by suitable strings to these endless aprons, or bands, and the whole made to revolve. Soap-suds cover a few inches of the bottom of the box, and into this the clothes dip, and are squeezed between the bands and the rollers, the latter leading the former in a tortuous course.

This, we believe, is a fair description; and if so, we apprehend that there will be a dangerous interference of garments as they pass by each other, and that in their rencounter such fearful rents will often be made as to render it necessary to place them in the hands of the surgeon, ycleped a seamstress, to sow up their wounds.

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31. For a machine for *Exterminating Bed Bugs by Steam;* Thomas Miller, Newburgh, Orange county, New York, November 19.

We described a patent apparatus for this purpose in a former volume, and there remarked that the contrivance was a mere copy of one which had been described and figured in the London Mechanics' Magazine, and other English journals.

The machine consists, essentially, of a chafing dish, or furnace, with a boiler above it, from the spout of which steam is to be projected into the crevices containing the vermin. The present patentee has come forward in a style which indicates that he considers the whole affair as new. The only superior merit exhibited in the appa-

ratus as described by him, is its being made much more complex than that originally proposed; it is, in fact, quite a steam engine, with a steam tube, steam chamber, stop cocks, &c. &c. No part of the contrivance, however, is claimed as new, and from what we have already said, it may be inferred that we do not think it *altogether* so.

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32. For a *Mortising Machine;* Henry Mellish, Drewsville, Cheshire county, New Hampshire, November 19.

There have been so many machines for mortising, made the subject of patents, that from this circumstance, and the simple nature of the operation to be performed, we are not justified in looking after any great novelty in those which are now brought forward. Some difference in the arrangement of the respective parts is all that can be reasonably expected. There are in the present machine two chisels placed side by side, and worked up and down by a double crank, the shaft of which is turned by a band and pulley. The carriage upon which the stuff to be mortised is placed, is moved backward and forward by a rack and pinion, and is operated upon by the movement of the machine. The large wheel to which the power is applied, carries a mandril with a bit to bore the stuff, preparatory to mortising.

The claim is to the "machine taken as a whole; or the combination of the several parts, but particularly the two chisels having shoulders for driving out the chips, working alternately on a double crank.

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33. For a *Tenoning Machine;* Henry Mellish, Drewsville, Cheshire county, New Hampshire, November 19.

Two iron wheels, or disks, are fixed upon a vertical shaft, made to revolve by a band passing round a pulley; the iron disks are placed at a distance from each other exceeding that of the thickness of the tenon to be cut. Upon the peripheries of the wheels are placed chisels or cutters; and the pieces of timber to be tenoned are secured, by proper contrivances, upon a sliding carriage, so that the stuff can be brought up against the revolving cutters, which leave the tenon of the right thickness, and properly shouldered, when it has passed through the revolving disks.

There is no claim made; and this ought not to have been omitted, for although there appears to be sufficient novelty in the particular mode of cutting the tenons, the same may not be the case with all the other parts of the machine.

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34. For an improved *Machine for making cotton roving;* Lucilius H. Moseley, Lisbon, New London county, Connecticut, November 19.

This machine for making cotton roving, or roping, is in many of its parts similar to those already in use for the same purpose. The parts claimed as new are "the general combination of that part of the apparatus by which the condensing is effected; the reciprocating roller and revolving apron used, not being claimed singly and separately, they having been previously used, but only the particular

manner in which they are arranged and combined; by which mode of arrangement the desired end is most perfectly obtained, which had not been accomplished by any of the arrangements heretofore made. The single geared cone is also claimed as constructed, and connected with the other parts of the machinery, upon the principle, or in the manner set forth; this single geared cone being applicable, and intended to be applied to, other machinery used in the manufacture of textile substances."

The particular arrangements referred to cannot well be explained without the drawings; a tolerable idea, however, may be formed of that part called the geared cone, from the description, which is as follows: "This geared cone consists of any number of toothed wheels, say seven or eight, gradually increasing in size so as to give them, when combined, a conical appearance. They are connected together, but slide upon their shaft, by means of a feather, which allows them so to do, but causes them to revolve with the shaft. The wheels which constitute this cone are thrown alternately into gear with the machinery which produces the traversing motion of the carriage, and the winding of the condensed roping upon the spools. The cone, as thus constructed, is a great improvement upon those before used, which were double, in order to their producing the effect intended. The sliding of the geared cone upon its shaft, which is essential to it as a single cone, obviates the necessity of much gearing, and among its many other advantages, possesses that of being very easily shifted."

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35. For a *Machine for Cutting Straw;* William Mitchell, Anderson District, South Carolina, November 19.

A straw cutting machine operating in the same way with this, only better arranged, has been in use for half a century; should the patent now taken not be sustainable on the score of novelty, extensive and long tried utility may at all events be pleaded in its favour. A heavy wheel is to be made to revolve vertically, and is to carry knives, or cutters, extending from its centre to its periphery, and the straw to be cut is fed up to the knives in a horizontal trough.

In all the cyclopedias, encyclopedias, and works on agriculture which have appeared during the last age, there are representations of M'Dougal's machines for cutting straw, operating on the foregoing principle; and if that before us is an improvement, this term must be employed under a very different acceptation to that which we have been in the habit of ascribing to it.

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36. For a *Truss for Hernia;* John Morris, Derby, New Haven county, Connecticut, November 19.

The spring of this truss is to be made of round, brass wire, which may be about one fourth of an inch in diameter. The middle part, which is to come against the side of the body, is to be flattened by hammering, and may be covered with any suitable material. This spring is to be bent round in the usual form. There are to be two

pads, which it is proposed to make of leather, joining two thicknesses together, and rounding the edges neatly. A brass plate nearly the size of the pad is to be placed on the outside of it, and in the middle of this there is to be a knob, with a hole drilled through to receive the ends of the spring. The shank of this knob passes through the leather pad, and is riveted to a small brass plate on the inside. The wire spring is to have a hole of about $\frac{1}{16}$ inch drilled through within $\frac{1}{4}$ inch of each end, and another about $1\frac{1}{4}$ inch within it. When the pads are put into their places, a wire staple, forming a semicircle, is to be bent and riveted into these holes; thus allowing free play to the pad. These staples lie in the planes of the pads, the bow being upwards when the truss is on the body.

The claim is to "the use of the materials of which it is composed, for this purpose; and such a construction and arrangement of the parts as secures in the most natural and easy manner the needful horizontal or sliding and revolving motions of the parts, self-adjusting to the various motions of the body, without the incumbrance of springs or any other means."

The advantages named are the facility with which the spring may be bent by the wearer so as to fit the body; it being less acted upon by moisture than is iron or steel; the cleanliness of the leather pad, and the facility with which it may have any covering placed over it.

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37. For a *Forcing Pump;* Benjamin Saphan, Waterford, Saratoga county, New York, November 19.

Although the principle upon which this pump operates is old, there is an arrangement of the parts sufficiently new upon which to found a claim for a patent. The principle is the same with that of the *pompe des Prêtres*, first, we believe, used in the *Jardin des plantes*, in Paris, at least a century ago; and described in some of the books as a "pump without friction," for although it is not absolutely so, the ordinary friction of the piston is entirely dispensed with; a diaphragm of leather crossing the chamber, being made to perform the office of the piston. This pump is described in "Nicholson's Operative Mechanic."

In the pump, which is the subject of this patent, the leather diaphragm is used, and is made to act so as to convert the instrument into a double forcing pump. The body of the pump is made in two parts, each of which will bear a resemblance to a common wash hand bowl, with its projecting rim, representing the flanches by which the two parts may be bolted together. When they are attached to each other, a piece of leather crossing the body of the pump is enclosed between the flanches, and is left bagging in the inside, so that it may play from side to side. The piston rod passes through a stuffing box in the centre of one of the halves of the body, and is secured to the centre of the leather diaphragm; and a lever at the outer end, acting like a pump handle, will serve to work it backwards and forwards. The leather is stiffened by pieces of metal so placed as to render its vibratory action efficient.

Projecting from opposite edges of the body, there are short tubes,

or necks, to which to attach the pipes for the supply and discharge of water; one half of each of these necks being cast with each half of the body. Two semicircular valves are contained in these necks; those belonging to the supply tube opening inwards, and those to the discharge tube, outwards.

This description will render the general arrangement manifest to those acquainted with hydraulics, and will, to them, point out the difference between this pump and those on a similar principle which have preceded it. The patentee observes that, "as the altitudes or positions in which this pump may be placed, and the modes in which the lever or handle may be applied are various, it is unnecessary to specify any one in particular." The claim is to "the double chamber and leather partition piston, supported by plates of metal as above specified, as essential parts of this improvement."

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38. For an improvement in the *Running of Mill Stones;* Reuben Kendall, Wilkes county, Georgia, November 19.

The improvements described in the specification of this patent do not appear to be of a very important character, nor is their general utility obvious; in addition to this, the patentee has not designated them, but has merely told us how he makes his spindle, his drivers, his bridge tree, &c.; mixing together, without discrimination, the new and the old.

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39. For *Cutting out, or Draughting Gentlemen's Garments;* Benjamin J. Lewis, Mount Vernon, Knox county, Ohio, November 19.

After describing "the delineator" with its scale of divisions; "the protractor," and a considerable number of "diagrams," representing the individual pieces which in their aggregate state are to form a garment, through six well filled pages, the patentee "claims to be the inventor and discoverer of the protractor; also the manner of drafting by all the diagrams attached to the instrument, except the diagram of the frock coat skirt; also the addition of the thirty seconds to the scale of divisions; and also the form of the *instrument;* as well as the combination of numbers calculated for height and waist."

Were we to form a judgment from the practice of our own little tailor, we should be led to conclude that the multiplication of *mathematical scales, protractors, delineators, squares,* and other instruments intended to render judgment and practice unnecessary in the art and mystery of cutting garments, had made it difficult to choose among them, and thus tended to cause them all to be laid upon the shelf. For five or six years past, whenever a new coat was to be made by our professor of cutting, the requisite dimensions have been taken by different instruments, some of them quite formidable, if not terrific, in appearance; we recollect one very much like a gibbet, and others resembling sundry instruments of torture; but the same apparatus was seldom, if ever, used a second time; and a few days since, having ourselves to undergo a similar operation, nothing was applied but a

simple tape, divided into inches; and yet the coat, to the uninitiated, at least, appears to set as well as those which were mathematically elaborated. This does not look well for the development of genius.

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40. For an improvement in the *saw mill;* Nathan Kirk, Frankfort, Clinton County, Indiana, November 19.

The improvements stated to have been made consist in so arranging the machinery of a saw mill, that after a log has been slabbed, and fixed upon the carriage, it shall be sawed completely up, to timber of any gauge, without manual assistance; the raising of the feed hand, the running back of the carriage, the shifting of the head and tail blocks, and all the other changes required, taking place in regular succession.

The description is too brief, the drawings are too imperfect, and the references to them too few, to enable us to form a correct judgment respecting the machinery, nor is any part of it specifically claimed.

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41. For a *Self Sharpening Horizontal Plough;* Cyrus N. M'Cormick, Rockbridge county, Virginia, November 19.

There are certain shifting parts to this plough, to adapt it to hill side ploughing, and the things claimed consist in "the peculiar arrangements and construction of the several parts of the plough, and particularly the mode of forming the point at the end of the mould board, on which the share turns, and the two braces with the space between them, in which the neck of the share works; the brace near the neck of the mould board; the two projections on which the mould board slides; and the share, with the mode of turning it by the latch rod."

Should the security of this patent depend upon the mode of constructing certain braces, and the exact manner of conducting certain motions, we fear that it is not quite safe, being apprehensive that it would require no great share of ingenuity to avoid, or evade, the operation of a right so founded; dependence may be more securely placed on the *general*, than on the "*peculiar* arrangement and construction of the several parts."

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42. For an improvement in *Axes and Edge Tools;* John F. Mackie, City of New York, November 19.

From the description given, it would appear that this, so called, improvement, cannot be applied to edge tools generally, but must belong exclusively to axes, or other cutting instruments equally massive.

The head, or pole, of the axe, containing the eye, is to be in one piece, and the cutting part, or edge, in another, the latter division, judging from the drawing, being equal to about two-fifths of the length of the instrument. The two parts are to have projections and openings adapted to each other, like the joints of a butt hinge, or the teeth of a wheel; and when placed together they are to be retained

by passing pins, or rods, through openings drilled in the joints, across the axe. The claim is to "the axe being made in *two* parts, with the alterable bit, or cutter, which may be removed and replaced at pleasure; also the mode of fastening, but not confined exclusively to the methods named."

The benefits which it is supposed will result from this manner of constructing axes, are said to be many, a few of which are given by way of example; of them we shall mention two or three only. By having a number of shifting edges, one axe will serve for cutting, and splitting, by merely changing the edges. By taking extra cutters, the necessity for grinding, whilst at work, is obviated, and accident by breaking readily repaired. When the article is to be transported, five dozen of cutters will not occupy more room than one dozen of axes, &c. &c.

The preceding may be called the profit part of the account, but, if a just estimate is to be made, it must not be taken alone. We do not expect to find the opposite, or loss, side, in a specification, but it is our business in endeavouring to strike a balance, to look after it, although it may have been overlooked by others. We apprehend that the objections would be, at least, as many as the enumerated advantages, but, as in the former case, we will give but two or three. When an axe is used to cut, the solidity of its parts is essential to its efficiency; but where pieces are to slip out readily, to be exchanged, and pinned into their places, this solidity must be sacrificed. The strength also depends upon the continuity of its parts, and we feel assured, therefore, that the readiness with which a broken cutter may be replaced by a whole one, will be accompanied by an increased readiness of fracture, which will call for the frequent resort to this *advantage*. Axes of this description, with several cutters all nicely fitted in their joints and pin holes, will be considerably more costly than those ordinarily made, more especially when the accidents to which they are liable, and the impossibility of getting them repaired, excepting by the maker, are taken into the account. The pins will rust in their places, will rivet up in being punched out, and to remove them the woodman must carry with him a suitable hammer and punch, and be pretty clever too in the employment of them. But a truce with objections; they present themselves in such numbers that we stop short; feeling inclined to confess that we ought to have done so at an earlier period.

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43. For machinery for *Making Window Sash;* Amos Miner, Elbridge, Onondaga county, New York, November 19.

Where stuff is to be sawed and planed, mouldings to be struck, mortising to be done, and shoulders to be cut by machinery, in the art of making sashes, it is no easy affair to steer clear of what has been previously invented and claimed, as there are already three or four patented machines for the same purpose. The operations being the same, the choice of means is necessarily limited, and it is not at all surprising that those which are identical should be employed by per-

sons entirely unacquainted with what has been done by others. If tenons are to be cut, two circular, or reciprocating, saws, placed at a suitable distance from each other, will naturally be resorted to; and if this can be called an invention, it stands a fair chance of being reinvented by every one who attempts to construct such a machine. That before us has such saws, and many other things in common with its predecessors, although they are not placed in exactly the same order; we do not, however, perceive any thing of which the patentee might have availed himself to have put in a legitimate claim to invention, unless the particular arrangement adopted by him would have answered the purpose, which we very much doubt; he, however, has merely described his machine, and claimed nothing.

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44. For a *Thrashing Machine;* David Porter, Boonville, Oneida county, New York, November 19.

There are included in the claim under this patent both a thrashing machine and a horse power by which to drive it. We apprehend that upon examination these would be found to be two distinct machines, and that if they were new they should have been the subject of distinct patents; it so happens, however, that there is nothing novel in either of them; and as such thrashing machines have not unfrequently been propelled by such horse powers, it was well enough to place them side by side as old acquaintances The former has a wooden cylinder covered with sheet iron and set with teeth, and a concave of cast iron. The latter is the ordinary combination of wheels and pinions, such as has been several times patented, without the possession of any claim to originality even when this sanction was first sought for it.

The claim is to "a cast iron concave to a wood machine, and the screws to regulate and govern the same; and the shaping of the teeth, and the rounding of the same so as to prevent the machine from breaking the grain, or cutting the straw; and also the hand and horse power."

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45. For *Locks for Doors, Safes, Chests, &c.;* William Parr, and James F. Fowler, city of New York, November 19.

There is not any thing very special in the arrangement of the respective parts of this lock which gives to it any preference to many others which have been patented here and in Europe.

The hole in the barrel of the key may be triangular, or in any other form adapted to turn the pin, or axle, upon which it is to fit, and which carries the cam that is to move the bolt backward and forward. This cam is in the form of a segment of a toothed wheel, there being corresponding teeth on the lower edge of the bolt. The security is intended to be derived from a number of catches, or sliding bolts, which must be pressed down to admit of the turning of the key. The pins upon which the pressure is to be made are of different lengths, and the face of the barrel of the key is adapted to them, having de-

pressions or projections thereon, which suit the respective parts to be depressed. The key itself is, on its outside, a round barrel merely, like that frequently used for latches.

"These applicants claim the apparatus for moving the main bolt, including the sliding bolts, springs, and tumbler, and the adaptation of the key thereto; but they claim no certain number of sliding bolts, which may be varied at pleasure from one to any required number, the steps in the key being varied to correspond therewith."

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46. For *Machines for Manufacturing Tobacco;* John B. Rappelyea, and Joel Barns, Covington, Campbell county, Kentucky, November 19.

The manufacturing process, as carried on by the machine described is said to be both simple and new, and "so perfectly *systematic* and *mathematic* that a boy fourteen years of age may be intrusted to manufacture by, and understand the whole economy of, the machines in two weeks." The machinery specified consists of a long table with a number of appurtenances;—what is called a diverge press—a cutting machine—and a double cast iron press. We shall not attempt to describe these separate parts of the machinery, but will observe that the tobacco is to be pressed in a very powerful press, so as to form thin sheets; it is then divided into equal portions by the cutting machine, which cuts it by means of circular knives into strips, which strips are cut across so as to form pounds, half or quarter pounds, or pieces of any other weight. The claim is to "the double iron press, the diverge presses, and cutting machine; circular roller; friction roller with iron collars; together with the mode of gearing and manufacturing systematically and mathematically, from one ounce to two pounds."

The specification of this patent has been drawn up with much labour, but it is by no means a model of clearness in the art of describing machinery. The drawings, however, which are very well executed, go far towards removing any defect from this cause, and induce us to believe that much more might have been claimed under the patent than has actually been done.

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47. For an improvement in the *Mode of Distributing the Ink, and applying the same to types* in letter press printing; John Prince, city of Philadelphia. Patent first issued April 23, 1830. Surrendered and reissued on an amended specification November 19.

Mr. Prince obtained a patent for his apparatus on the 3d of December, 1829, and his patent of April, 1830, was intended to be taken for an improvement on his original machine, but not clearly expressing this fact, it has been surrendered, as above stated. The claim, as now made, is "the manner of placing the springs, as described, and so connecting them with the sliding frame as to cause them to move the inking rollers backward and forward over the form; and also the effecting the same by means of a single rack."

48. For improvements in the *Machinery for Distributing the Ink, in the Hand Printing Press;* John Prince, city of Philadelphia, November 19.

In the machinery formerly patented by Mr. Prince the traversing of the inking rollers was effected by springs coiled in barrels, in the manner of clock springs, but for these he has now substituted springs wound cylindrically, in the manner of bell springs, which are contained within tubes. He has also added friction rollers, to lessen the friction in the traversing of the inking roller frame; to these two points the claim is confined.

We have seen the apparatus in action; it appeared to operate well, with scarcely any sensible increase of labour to the pressman, and it was well spoken of by the printer who had it in use.

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49. For an improvement in the *Mode of Producing Artificial Light;* Samuel Morey, Oxford, Grafton county, New Hampshire, November 19.

(See Specification.)

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50. For *Cisterns and Reservoirs;* Horace J. Shumway, Van Buren, Onondaga county, New York, November 19.

Cisterns, or reservoirs, to hold water, or other liquids, are to be dug in the ground, and the walls of earth are to be plastered over by a cement made of hydraulic lime and sand, mixed in the usual proportions. The novelty in this proceeding consists in applying the cement directly upon the surface of the ground, without first building a wall of brick or stone. The advantages said to result from this are several; besides the economy of the process, it is stated to be more durable; as the change in the brick or stone wall, from settling, expansion and contraction, &c. is said to crack the plaster, while such accidents will not take place with earth walls.

It is proposed, in addition to the sand, sometimes to use gravel, which may either be mixed up with the cement, or applied to the surface of it whilst in a moist state. The claims made are "for plastering upon earth walls instead of plastering stone, brick, or wood, as heretofore; for applying said cement to the constructing and building of cider cisterns or vaults, tanner's vats, salt vats, and reservoirs for holding large quantities of liquids. For the use of gravel to stiffen or harden the mortar, which has not been heretofore used in the manner specified, to form a cement, or to stiffen the mortar."

In a firm clay soil, we have no doubt that cisterns made in the way specified would answer the intended purpose; but in the greater number of situations, we think they would not, as it cannot be intended to give to the water cement lining such a thickness as shall sustain the pressure of the earth, which, in most places, requires a wall of considerable strength. In cisterns which are to be kept constantly full, the pressure of the contained liquid would do much towards sustaining that of the earth, but in those which are sometimes to be empty

the danger would be greatly increased. The last item of the claim, that of using gravel to stiffen the cement, is one which certainly cannot stand, as this article has frequently been used both with ordinary and with hydraulic lime in forming a cement.

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51. For an *Odometer, or machine for telling the distance traveled in a wheeled carriage;* William A. Turner, Plymouth, Washington county, North Carolina, November 19.

(See specification.)

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52. For a *Mortising and Tenoning Machine;* Loammi Sprague, Micajah Noyes, Thomas Lund, jr., and Jesse Ayres, Dunstable, Hillsborough county, New Hampshire, November 19.

We shall not attempt to describe this machine, as it consists of too many parts for mere verbal description; and most of these in their individual capacity are similar to those used in other machines. The patentees have not claimed any particular part as new, but have confined themselves to "the general construction of the before described machine, with the arrangement and adaptation of the several parts to produce the effect intended."

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53. For a *Straw Cutter;* John Shaw, city of Philadelphia, November 19.

The advantages of this straw cutter are said to consist in its cheapness, and the ease and rapidity with which the work may be done by it. With respect to its novelty, we have no information, but think that though there certainly is not much of this ingredient in it, enough might be discovered upon which to found a claim, although not a very broad one. There is to be a trough, of the common construction, to hold the straw; but there is no provision made for advancing it. There are uprights at the front end of the trough, which serve as guides to a frame to be worked up and down by a treadle. A knife crosses this frame obliquely, and a board is fastened upon the frame, as much in advance of the knife as the length of the straw to be cut, and against this its ends are to rest.

Such, we believe, is a true description, but in giving it we have been compelled to guess a little, as the explanation given is not a very clear one. If there is any novelty in the affair it is in the manner of placing the board to govern the length of the straw; but in this there is a defect, as in descending it must necessarily rub upon the ends of it, and thus create friction.

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54. For *Apparatus to propel canal and other vessels;* Jeremiah Smith, of the city of New York, and John Brown, of New London county, Connecticut, November 19.

Ropes, or chains, are to be extended along rivers, or canals, and the boats are to have band wheels on them, turned by steam, or other power, to give motion to these wheels.

We venture to predict that this mode of passing *along* rivers and canals will not make a fortune for the inventors, for where it has been essayed in *crossing* them it has been found to be a troublesome business; the plan is equally deficient in novelty and in utility.

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55. For a *Cooking Stove to burn anthracite coal;* Hezekiah Steel, city of Hudson, New York, November 19.

This stove is to have two vertical cylinders to receive the fuel, and these are to be placed at such a distance from each other as to allow of an oven to stand between them. The heated air from each fire may be conducted under and around the oven, when baking is to be performed; or, by closing dampers, it may escape directly into the flue above the oven. The grates are to be hung on pins, that they may be inverted in order to discharge the fuel, and in the cast iron hearth there are slides to lessen, or to close, the draft.

"The form of said stove, the construction, the application of the heat to the oven, and the continued increase of space for the passage of air from the fuel to the flue, I claim as improvements not heretofore used or known."

The principal novelty in this stove is not included in the foregoing claim; it is that of burning two fires to heat a single oven; as respects the other points, we see nothing new in them in the loose and general manner in which the claim is made; some peculiarity in the construction of the parts ought to have been pointed out, to enable us "to distinguish the same from all things before known or used." If this had been attempted, the claim would have been confined within narrower limits than it is, although expressed in a greater number of words.

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56. For an improvement in the *Grooving Plane Bit;* John Shugert, Lawrenceville, Alleghany county, Pennsylvania, November 19.

This grooving plane is a tongueing plane, the title therefore is a misnomer, but this is a point of little importance. There have previously been patents granted for making the bit of a plane of this kind in two parts, so that the distance between them may be regulated. In the present instance the two parts are to be united at their upper ends by a plate of iron; this plate is to be riveted to one of them, and screwed to the other in such a way as to fix it firmly, but still to leave it capable of being set closer or wider. "The patentee claims as original, the back plate, the screw, and the mortise in the back plate."

If the original claim to the making of such irons in two parts was valid, the present patent might be for an improvement thereon, but this would not give a right to the original invention.

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57. For an improvement in the *Water Closet;* Edward Robinson, city of New York, an alien who has resided two years in the United States, November 19.

This patent is taken for the particular arrangement of a crank and lever which operate in the action of the water closet, the general construction of that apparatus remaining unchanged. Although water closets are but little used with us, they are very common in Europe, and a considerable number of patents have been obtained for them both in England and in France; we know nothing, however, adverse to the special claim above set up.

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58. For a *Machine for Cutting straw, hay, potatoes, &c.;* Amos Russel and Noah Davis, Syracuse, Onondaga county, New York, November 19.

The straw, or other article to be cut, is to be put into a vertical hopper, in which it will sink down by its own gravity. Under the hopper a cylinder, 28 or 30 inches in diameter, revolves, and carries knives, which project from its surface to a distance equal to the length of the straw. These knives are placed diagonally, and act against a steel plate on the lower edge of the hopper. The claim is to "the cylinder, and its position under the hopper, and the manner in which the knives cut against the steel plate."

A straw cutter, with a hopper constructed in a similar way, was patented by James Luckey on the 9th of March, 1833, and is noticed in vol. 12, p. 176, but in that a board carrying the knives had a reciprocating motion.

What, however, is still more remarkable, is that a cutting machine patented on the same day with that under consideration, No. 27 in the present list, is precisely like it, having a cylinder operating in the same way. The hopper, or case to contain the straw, &c., is in each of them represented in the drawing with folding doors. The verdict, we suppose, must be "chance medley."

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59. For improvements in the *Pump for raising Water;* Jesse Reed, Marshfield, and Josiah Reed, East Bridgewater, Plymouth county, Massachusetts, November 19.

The pump described is intended to be made of cast iron in its upper part, and to have a tube of lead to extend into the well; particular modes of arranging the valves are described, principally with a view of rendering the junctions tight, and of allowing the lower valve to be opened permanently, that in frosty weather the water may escape through it. Three different modes of connecting the pipes and valves by plates of iron, are described, and the claims are to "the different modes of adjusting the plates, and connecting with them the flanch of the pump and lead pipe; and the mode or method of letting off the water from the cylinder."

The patentees have very properly confined themselves to the particular arrangements which they have described, and to these they have a right; we do not, however, think them of much importance, not being aware of any existing difficulty which they have overcome, although the patentees, of course, think differently.—There have been modes devised for opening the lower valve in me-

tal pumps, but in cold climates such pumps ought not to be employed for common purposes, their extreme liability to freeze rendering them very troublesome: and even in warm weather wood is to be preferred by those who do not wish to drink warm water.

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60. For *Raising Water for turning Mills;* William Mead, Pittsburgh, Allegheny county, Pennsylvania, November 19.

It is unnecessary to describe the apparatus here patented, with its array of cylinders, pistons, valves, fly wheel and levers, intended to raise water, because it will never carry this intention into effect. Perhaps it is not strange that persons who know nothing of mechanics should think themselves wiser than seven men who can render a reason; but it certainly is a little surprising that when a model of a machine might be made of tin, or other cheap material, and its operation tested, men should go to the trouble and expense of making a model for the office, and taking out a patent for an untried project, and especially for one which contains within itself the very essence of a perpetual motion.

In the present instance water is to be forced by hand, or otherwise into a cylinder, "until the pressure becomes sufficiently great." The water is then to set pumps at work, which are to supply a portion sufficient to rush into the buckets of a water wheel, causing it to turn round, and in so doing to drive all the machinery of a mill; to whirl round a heavy fly wheel; vibrate levers; open and close valves; pump up water for its own maintenance; and so to continue in operation, neither exhausting itself, or the reservoir from which it is supplied.

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61. For an improvement in a *Machine for Dressing Spokes;* Daniel H. Wiswell, city of New York, November 19.

The present patent is taken for an improvement in the knife or cutter used in a machine for which Mr. W. originally obtained a patent. The cutters, as formerly made, were changed in form by grinding and sharpening, and would not therefore continue to cut the spokes precisely alike; those now used are bent so that their inner sides would fit exactly on to a dressed spoke, for one half of its width; the outer edges are beveled, and when ground or sharpened, the form of the inner edge remains unaltered. A number of these cutters are fixed around a wheel, thus forming a ring of cutters, against which the spoke is to be brought up, as heretofore; the general operation of the machine remains the same as formerly.

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62. For *Straps for Pantaloons;* Enos Wilder, Boston, Massachusetts, November 19.

The patentee says that his "invention consists in the application of spiral springs, with cat gut strings, or other material," to pantaloon straps; and the advantages proposed are the "giving elasticity to the strap, and preventing any great or sudden strain upon the pantaloons, and to keep them properly adjusted."

63. For *Dying Woollen goods;* Hugh Young, Wheatland, Monroe county, New York, November 19.

In the specification of this patent, a description is given of the manner of dissolving grain tin in a mixture of nitric and muriatic acids, with certain precautions to be observed, most, if not all, of which, however, are well known to every competent chemist and scientific dyer. The necessary mixtures and manipulation in dying scarlet, crimson reds, orange, &c. &c. are likewise given, and a claim is made to "the invention of mixing and compounding the acids, and of applying them in the manner mentioned, to the purposes of dying." There may be novelty in some parts of the procedure, but in most of them there is not any, and as the new and the old are not distinguished from each other, we are left in the dark as regards what it was intended to patent; a common and fatal error.

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64. For an *Oil or Spirit Gas Lamp;* Joseph M. Truman and George Truman, Penn township, county of Philadelphia, Pennsylvania, November 19.

This lamp is intended principally for streets, public buildings, halls, &c. where a brilliant and steady light is required. It is constructed for the combustion of oil, tallow, or other articles capable of being burnt in lamps. The inventors denominate it a gas lamp, because the upper part of the reservoir for oil, &c. forms what they denominate a retort, in consequence of its being so constructed that the flame of the burning wick shall heat it sufficiently to decompose the oil, and partially convert it into gas.

The flame which ascends from the reservoir is surrounded by a glass chimney, in the usual way; and this glass chimney is surmounted by a metallic tube, into the lower part of which the glass enters. The metallic tube extends above the glass, to the height of from twelve to sixteen inches, and is called the illuminator, as, by its aid, the flame may be made to ascend to nearly the top of the glass chimney, and to afford a very brilliant illumination, without any smoke; this illuminator appears to be one of the most essential features of the lamp. The patentees say "What we claim as our invention is the employment of that part which we denominate the retort, used in the way herein described, and consisting of one or more plates to be let down upon the flame; we also claim the lengthening out of the glass chimney by means of the illuminator, without which the combustion will not be rendered effective."

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65. For a *Double Spring Truss for Hernia;* Daniel Weaver, city of Baltimore, November 19.

The patentee, in his petition, states that the "double spring truss consists of two trusses connected in front by a hinge; each half of the truss passing round one side of the body, and forming an exact counterpart to the other." The double spring is to be used whether the hernia be only on one or on both sides; there are to be two pads behind, one bearing on each side of the spine. The two pads are con-

nected by a short strap, and there is a strap and buckle at the side to fasten and adjust the truss. There is nothing peculiar in any other part; the pad, or pads, in front and their connexions, as described, being very similar to others in use. There is no claim.

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66. For a *Portable Razor case and Dressing box;* Harvey Wright, Bristol, Hartford county, Connecticut, November 19.

We have here a brief specification of the contrivance above named, being told, in some ten or twelve lines, that the said box may be made of wood or metal, of different dimensions, having a lid hinged on one side of it, with a piece of looking glass within the lid. The body of the case to have divisions for razors, soap, brush, strap, comb, paste, &c. "and the whole is connected together so as to be easily portable."

We will not offer a long comment on so short a text, but dismiss the subject with the pithy observation, that "comment is unnecessary."

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67. For an improvement in the mode of *Tuning Piano Fortes, and other stringed instruments;* John J. Wise, city of Baltimore, November 19.

We are very apprehensive indeed that the main end which it is proposed to accomplish by the invention before us, will never be attained, namely, the enabling a person without a musical ear to tune a piano forte, or other stringed instrument, by mechanically measuring the tension given to the respective strings; and we are quite sure that the apparatus here patented for the purpose will not effect it. There is some ingenuity about the thing, but more fancy, and although this latter quality may operate very well in poetry, it is of but little avail in such prosaical articles as mechanical contrivances, even when they are applied to musical instruments.

A barrel, like that for containing a watch spring, but about four inches in diameter, has the socket of the turning hammer passing through its centre as an axis. On the upper side of this box, which may be called the handle of the hammer, is a dial plate, with an index to point out the tension of the string, which is to be determined by the corresponding tension of springs within the box, these springs being acted on by turning it. We cannot, without the drawings, attempt to describe the particular arrangements, and these, after the opinion which we have given we shall not be expected to furnish. The tuning pins are to be fixed by a very complex contrivance, so that each of them may be loose whilst the tension of the string is ascertained, and then tightened by a thumb screw.

It is also proposed, in some instances, to draw up two strings at once, by allowing one continued wire to form two unisons; the doing of this, however, was made the subject of a special patent by Mr. Babcock, some three or four years ago, and cannot therefore be again legitimately claimed. The claims made are to "the arrangement or mode by which the movable ends of the strings are fastened or

loosened, as well where there is a tuning pin to each string, as where the piano is so strung as to require only one tuning pin for two strings. The mode of tuning a piano, or stringed musical instrument, without the assistance of the ear, by measuring and ascertaining the degree of tension necessary to produce any required note upon a given string, or strings, and furnishing the tuner with the means of applying that degree of tension precisely, and mechanically, and the combination by which the end desired is effected."

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68. For *Wheels for Rail-road Cars;* Ross Winans, Civil Engineer, city of Baltimore, November 19.
(See specification.)

Note.—In the list of Patents for September, in the last number, the six from 40 to 45 inclusive, dated on the 19th of that month, should have been placed in the list for November 19th, making the whole number issued on that day, 74.

SPECIFICATIONS OF AMERICAN PATENTS.

Notice of a patent for Lubricating the Piston, Piston Rod, &c., and improvements in other parts of Steam Engines. SAMUEL HALL, *Bassford, Nottingham county, Great Britain. Granted in pursuance of a special Act of Congress, passed March 2nd,* 1833. *Issued November* 19.

The title of this patent includes "an improved piston and valve for steam, gas, and other engines; an improved method of lubricating the piston rods, valves, or cocks, of such engines; and of condensing the steam and supplying water to the boilers of such steam engines as are wrought by a vacuum produced by condensation." The patentee thus sets forth his claims:—

"FIRST.—As respects lubrication, my claim consists in the effecting of the separation of the oil, or other lubricating matter, from the water, by the process of the distillation, or evaporation, and the consequent more accurate separation of the water from the lubricating matter, than by the methods described in my aforesaid patent; and by the above mentioned use of the boilers whereby the size of the separating vessels described in my aforesaid patent may be dispensed with; and in taking the oil for the purpose of lubricating, from the surface of the water within the boilers, even when in a state of agitation caused by ebullition, whether the oil be separated and taken away by the apparatus I have described, or by any other suitable means.

"SECONDLY.—As respects the condensation; it consists, *first*, in keeping the water, or other fluid resulting from the condensation of steam, or vapour, more effectually within the refrigerating pipes, by

tubes inserted in the caps at the ends thereof, as already described, or by any other suitable means; *secondly*, in effecting a more uniform passage of the cold water among the refrigerating pipes, from one end of the cistern to the other, by means of plates properly disposed for that purpose; and *thirdly*, in opening the foot valve of the air pump when applied to my improved apparatus, by any suitable means, so as not to require such pressure of water, or other fluid, or vapour, against it, as is requisite to open it, whereby the vacuum may not be so good on the one side of the valve as on the other; whereas, by the opening of the valve in the way I have described, or in any other proper manner, the vacuum may be more uniformly the same on each side of the valve.

"THIRDLY.—As relates to my claim to the other useful purposes to which my method of condensation is applicable, it consists in the application of my apparatus for, and method of, condensation described in this patent, as well as those described and limited in my aforesaid patent, whether used separately or together, for the purposes of distillation, evaporation, and desiccation, of all matters to which they are applicable, and whether those processes are performed in vacuo, or otherwise, and whether the processes of distillation of spirituous or other liquors be applied to produce motive power as well as to obtain the respective products of distillation."

It will be seen that the patentee, in the foregoing claim, refers to a previous patent, and in the commencement of the specification it states the present application to be for "certain improvements on certain parts of a patent of the United States of America, for which he made application on the twenty-third day of June, 1832, entitled a patent for *An improved piston and valve for steam, gas, and other engines; and also an improved method of lubricating the pistons, piston rods, and valves, or cocks, of such engines, and of condensing the steam, and supplying water to the boilers of such steam engines as are wrought by a vacuum produced by condensation.*" This reference appears, under existing circumstances, to be incorrect, as no such patent is in existence. Mr. Hall, it is true, made application to Congress to authorize him to obtain one therefor, but his application was unsuccessful. The patent, however, was obtained in England, and is dated December 22nd, 1831. The specification of it is to be found in the "Repertory of Patent Inventions," for December, 1832, and in other English Journals; to understand the references made, we must, therefore, apply to a foreign source.

In the English patent, a mode of lubricating the piston, &c. by injecting oil into the cylinder, is described; and under the same head, the method of separating the oil from the water is pointed out; in the patent before us, we find nothing about the lubrication, excepting in the title, but only an improvement in the manner of effecting the separation of the oil, or other fatty matter, from the water. The mode of condensation adopted, and described in the English patent, consisted in avoiding the usual injection of cold water into the condenser, by a peculiar mode of using metallic surfaces, which were the coverings of channels through which the water formed by the condensa-

tion of the steam is to pass. The present patent, it will be seen, is for an improvement upon the particular mode described. The third head in the present patent relates, mainly, to the use of the condensing apparatus as a refrigerator in distilling, and in analogous processes.

We have no doubt that a part of Mr. Hall's contrivances are real improvements; as, for example, his manner of constructing, packing, and lubricating his pistons, as described in his English patent; this, however, and all the other points there claimed are with us public property, the improvements thereon, set forth in his American patent, being all that he can claim here.

There are several things relating to our patent laws which render it desirable that they should pass under revision by the Legislature, and among them is the propriety of granting patents to foreigners residing abroad. All special legislation upon the subject is a great, and must be an increasing, evil, for when a special act is passed in favour of one foreigner, it holds out a lure to others to seek the same favour; and however careful a committee of Congress may be, it will often be impossible for them to obtain a correct judgment of the particular value of an invention presented before them; we think, therefore, that such patents ought to be uniformly denied, or generally granted. We were, at one period, opposed to the policy of granting patents to foreigners, and as a matter of mere policy, we should still entertain the same opinion, as there are but very few instances in which the invention will not reach us from abroad, unshackled by any monopoly; but, assuredly, there is something due to comity as well as to policy, and while so many of our own citizens are allowed to tax the subjects of other countries for their own benefit, it would seem right that we should give something to the principle of reciprocity. It would appear proper in this case, however, not to admit foreigners to the privilege on the same terms with our own citizens, but to charge them as high a fee as that demanded from Americans in their respective countries.

Specification of a patent for a Lamp, or Apparatus for Producing Artificial Light. Granted to SAMUEL MOREY, *Oxford, Grafton county, New Hampshire, November* 19, 1833.

This improvement consists of a metallic cylinder of such dimensions as may be desired, strong enough to bear a pressure of three or four pounds to the inch. In the centre of the top of this cylinder, there is to be a small tube inserted, about half an inch long, with a single hole in the upper end, of about from one-twentieth to one-sixtieth of an inch diameter. Round this small tube with a single hole, there is to be another tube an inch or more in diameter, and about an inch long, soldered to the top of the cylinder, having a cap that may be screwed on, or taken off; in the centre of which cap a screw may be fastened about one-eighth of an inch or more diameter. Around this screw, and in a circle, holes are to be made, about one-fiftieth or

one-sixtieth of an inch diameter, and about one-third of an inch apart. A conical tube, about three inches long, and about three-fourths or more of an inch diameter, at the lower end, having a bar across near the bottom, with a hole and screw in the centre to fit that in the lower end of the conical tube. In the top of the cylinder a safety valve is to be affixed. It is then ready for use. To use it, put into the cylinder, through the safety valve, half a gill, or more of spirits of turpentine, and about the same of water. Apply heat to the cylinder until the vapour issues pretty freely through the conical tube on the top. If a flame is applied to that vapour, it takes fire, and burns with a beautiful white flame, like a gas light. If there is any smoke, turn the conical tube on the top to the left, which will admit more air at the bottom to be mixed with the vapour in its ascent up the tube. As the vapour issues through the small holes in the cap, into and through the conical tube, by the pressure in the boiler, it will mix with, and carry along through the tube, in passing along, more or less air, in proportion to its velocity, by which means it is easy to make these lamps burn with all degrees of intensity, from that of a white flame and smoke, to that of a very intense white, to blue and white, and to that of all blue, and from that to perpetual explosion. These cylinders, which may be made to hold half a pint, or many gallons, it will be well to enclose in such a manner as to preserve the heat; thin plates of tin answer well, and it will require that they be as much longer than the cylinder as will allow of a standing on the bottom under the cylinder, when desired to heat it with oil, or alcohol. It seems immaterial how, or in what method the heat is applied, so that it is steady, and can be readily lessened or increased. To light-houses, or wherever a large flame is required, most likely nothing will be better, or cheaper, than anthracite coal, unless the heat is applied from the same stove, or lamp, after once in operation. The flame of a lamp of alcohol, not much, if any, larger than that of a common candle, will cause vapour enough to rise, or issue, to give the light of ten or fifteen candles, and heat enough to boil a two quart tea kettle in seven or eight minutes. When the vapour issues freely and rapidly out of the conical tube, and is inflamed, it is plain to see the effect at least of the rapid recomposition of water. The flame will be a light blue for some inches above the tube, and on the outer edge of it, there will, apparently, be a border, which has the appearance of decreasing rapidly towards the outer edge, and becomes entirely invisible in about one-eighth of an inch. The heat increases as the flame becomes less and less visible, and this is continued not only to where there is no appearance of any flame, but to a sensible distance beyond; where the heat is more intense than any where within the visible flame; which is made apparent by holding a fine wire across the flame. There does not appear to be any smell of turpentine from these lamps, unless the vapour is allowed to escape without being inflamed. Alcohol and spirits of turpentine may be made to burn in the same for many uses, particularly for lighting and warming rooms; but when alcohol is burned, it will require only about one-fifth or one-sixth of spirits of turpentine to give it the white

flame; or alcohol may be mixed with water in any proportion, but the greater the proportion of water, the more spirits of turpentine will be required. In the latter part of my experiments, I have generally made the covering in the form of a common tin plate coffee-pot, as much larger than the cylinder as would allow of setting in a lamp on the bottom, through an opening on one side. The use and object of the box on the upper end of the cylinder, is to answer, in a great measure, the purpose of a gasometer in gas works. It allows of working with much pressure in the boiler, thereby giving a much steadier issue of vapour. And as it passes into the box with a number of holes, the issue from those holes is easily adjusted, so as to have it mix with a due proportion of atmospheric air before it is inflamed, and with a velocity that will insure its further supply, sufficient to insure a most perfect combustion; giving to this mode great and decided advantages over all others in burning the vapours of the liquors before mentioned, as well as all others that can be conveniently evaporated, and that are combustible: and I can see no reason why carburetted hydrogen gas may not, in this way, be burnt with a large volume of flame, without any smoke, which will in many cases be very useful. The great and surprising volume and quantity of light and heat given out by these lamps and stoves, appears to me, evidently, to arise from the perpetual decomposition of the water in the combustion, and its recomposition from the air within the flame, as well as that surrounding it; which is owing in a great measure to the vapours of the liquors which contain much carbon as well as hydrogen, being so intimately mixed and blended with a great supply of atmospheric air, both before it is inflamed and after, and that constantly. These lamps have this great advantage, that the same lamp can be made to burn regularly with the light of one or two candles, or twenty, or thirty, or more. Nothing can be more convenient than these lamps are for cooking, to a certain extent; with a half gill of spirits of turpentine, as much water, and one-eighth of a gill of alcohol, two, or more, two quart tea-kettles can be made to boil in less than five minutes each, and bread toasted and meat enough for three or four men may be boiled. In boiling meat, it will be necessary to turn the tube off laterally, a few inches, and to have the flame blue or nearly so. So again, nothing, I should think, could be more convenient for soldering, than these lamps; for the moment you bring a piece of thin sheet copper in contact with the blue flame, having a piece of silver solder, or common silver and borax on it, the solder is instantly melted, and the copper very soon. So also small brass wire brought over the flame, instantly drops to pieces; and small copper wire is as soon melted, and very fine iron wire, when the mixture of air and vapour is in the best proportion, is instantly inflamed.

What I claim as my invention, and for which I ask a patent, is an improvement upon the mode of producing artificial light and heat for illumination, or other purposes, by mixing together, in suitable proportions, water, alcohol, or water and alcohol with spirits of turpentine, in a cylindrical, or other shaped, vessel, and inflaming the vapour extricated by heating the said mixture—which improvement

consists principally in causing the vapour of the liquors to issue through holes from the evaporator into a small box, or reservoir, and from that box, or reservoir, through such a number of very small holes, into and through a conical, or other shaped tube, with such force and velocity as will insure its mixture with as much atmospheric air, as will, when inflamed, induce a perfect combustion,—the principles of which improvement are hereinbefore described. And I do hereby declare, that I do not intend to confine myself to any exact form or proportions in the apparatus which I employ, but to vary the same as may be desired, in any manner which admits of my operating upon the same principle, and in which a similar effect is produced.

SAMUEL MOREY.

Section of Morey's Lamp.

a Metallic cylinder.

b Small tube one-sixtieth inch diameter.

c Another tube one inch diameter.

d Screw.

e Safety valve.

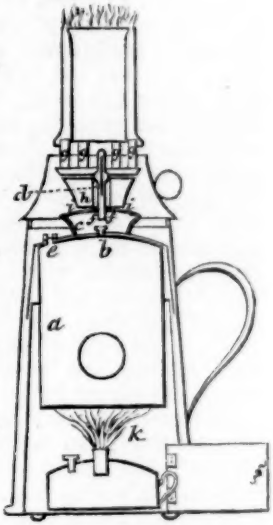
f Small apertures through which vapour issues to the tubes

g Tubes.

h Conical tube or receiver.

i Place for the admission of atmospheric air.

k Heat for generating vapour.



Remarks by the Editor.

The statements of Mr. Morey may be relied on most implicitly, in whatever relates to those facts which have come under his own observation; and he has been an indefatigable experimenter and observer, more especially as regards the production of flame by the combined action of alcohol, essential oils, and water. In an article published in Silliman's Journal, vol. xxv. p. 150, he says, "I have no doubt that I have tried lamps, stoves, and machines, in more than four thousand different forms, for effecting these purposes; and yet not many months have elapsed since I have felt entirely satisfied."

"The experiments which I have made, have proved practically, that an engine with a power equal to driving a boat four miles an hour, and a rail-road car twice that distance in the same time, with

ten or twelve passengers, may be made for one hundred dollars; and that the engine with its preparing vessel (a substitute for the boiler in the steam engine) need not weigh one hundred pounds—and the expense of working it will not exceed ten or twelve cents per hour. There are certainly no difficulties to be removed. These facts have been verified practically and repeatedly before hundreds of people.

"Some recent improvements in the mode of constructing lamps for burning water to produce light and heat, have perfected the operation for these purposes. It now carries demonstration in every form."

The foregoing observations are succeeded by some account of the effects produced by the flame, similar to those noticed in the specification of his patent; and Professor Silliman adds—

"We have seen some of Mr. Morey's experiments, and can testify to the correctness of his statements, as regards the great amount of heat and light evolved by combustion of the vapour of water mixed with that of spirits of turpentine or alcohol, and duly modified by common air. The results are very striking and beautiful, and we can see no reason why they should not prove of great practical utility."

We have not witnessed the operation of Mr. Morey's lamp, but as we have already said, we are satisfied as regards the correctness of the statements, although we by no means agree with the gentleman in his theoretical views. In the article to which we have alluded, Mr. M. has given these at some length, but in doing so he has assumed as settled certain points with respect to the nature of electricity, which are by no means generally admitted by philosophers; and upon these he has founded his theory, or rather his hypothesis. We, however, should deem it out of place here, to enter into an argument upon this subject; so far as the lamp and the patent are concerned, the question is one of facts, and it will afford us much more gratification to find that this invention is publicly introduced, generally approved, and fully compensating the author of it for his indefatigable and meritorious exertions, than we should be to establish our own theory, if we have one, of its *modus operandi.*

We will, however, make a remark or two, with respect to one point in the theory, that is, on the "burning of water." The idea of doing this is not peculiar to Mr. Morey, as others have taken patents for "water burners;" and certainly, the introduction of the vapour of water among burning fuel has, under many circumstances, the effect of quickening the combustion, and, more especially, of enlarging the flame; still we do not believe, in spite of this sensible evidence, that these effects are produced by the decomposition and recomposition of the water, but think that they arise from its mechanical action in diffusing the material of flame so as to expose it to a larger portion of atmospheric air. We have before made the remark, and will here repeat it, that so far as the production of light and heat are concerned, it would seem to us that the simultaneous decomposition and recomposition of water must neutralize each other.

Specification of a patent for an Odometer, or machine for indicating the distance traveled by a Wheeled Carriage. Granted to WILLIAM A. TURNER, *Plymouth, Washington county, North Carolina, November 19th*, 1833.

(WITH A COPPERPLATE.)

To all whom it may concern, be it known that I, William A. Turner, of Plymouth, in the county of Washington, and State of North Carolina, have invented an improvement in the Odometer, or machine for indicating the distance traveled by a wheeled carriage of any description, and I do hereby declare that the following is a full and exact description thereof.

As the mode of applying this instrument to any other carriage will be obvious from the explanation of the way in which I have applied it to a stage, or other four wheeled carriage, I shall in my description confine myself to a vehicle of this kind.

I drill a hole, longitudinally, through the centre of the axle of one of the hind wheels, to admit a rod which may revolve within the said axle, extending from the outer end thereof, to the middle of the axle. As such axles are usually bent, or curved, under the body of the carriage, the hole for the rod will, in such case, be free from the axle before it reaches the middle thereof; or, if straight, the axle may be constructed with an eye, or opening, in the middle, to allow the endless screw, or pinion, to act in the manner required. On the outer end of this rod, within the cap of the hub, I attach a piece at right angles thereto, having on it a jointed, or hinged, piece, so constructed that a pin projecting from the inside of the cap of the hub, will touch against it, and carry it round in one direction, but in consequence of the hinge, or joint, giving way before the pin, it will not turn it in the opposite direction; this is shown at *a* in the accompanying drawing, *b* being the rod within the axle; clicks, or stop joints, of this kind, are well understood by workmen. This click, when the carriage is backed, allows the rod, with the machinery attached to it, to remain at rest. Entirely to prevent all danger of the wheel work moving backwards from any stiffness in the click, I usually place a ratchet wheel upon some part of the revolving rod.

That end of the rod which is inwards, and which reaches to the middle of the axle, has on it a bevel wheel, or an endless screw, *e*, which mashes, or takes, into a wheel *f*, placed upon an axle, or revolving rod, at right angles to the former, extending out above the perch, and inclining a little upwards towards the body and front end of the carriage. This rod is made to run in proper boxes, or bearings. Soon after it leaves the axles, and at any convenient distance therefrom, it is furnished with an universal joint, *g*, in order that it may suffer any necessary deflexion from a straight line, without experiencing a resistance which shall be injurious, or obstruct its motion; and when it reaches the bottom of the body of the carriage, or nearly so, I employ a second universal joint, *h*, as the rod at or near

that point is subject to some change in its direction. Between these two universal joints, the rod by which the motion is conveyed from the gearing near the axle, to a revolving rod or axle, *i*, lying within the body of the carriage, is made double as at *j*, in such a way that one part of it may slide within the other, and admit of its being lengthened or shortened by the pitching of the carriage, and by its motion from the elasticity of the springs and braces upon which it is hung; whilst at the same time the revolution of the rod itself is not impeded, and the universal joints allow a free lateral motion. One of the most simple modes of forming this slide, and which answers perfectly well in practice, is to make one part of the rod a socket with a square hole, and the other portion square, fitting into and sliding freely in this hole; this rod I denominate the accommodation rod.

At the bottom of, and within, or under, the body of the carriage, the rod which conveys the motion is boxed up in any convenient way, by which means it is defended from injury; it runs in proper bearings, and where its direction is changed, as at *k k*, this may be done by universal joints, or by pinions. At its upper end *l*, it has an endless screw, a pinion, a fork and cross, or other contrivance by which it may give motion to the wheel work, and index plates which I usually place within the carriage near the upper end of the front, directly at the back of the driver. The same, however, may, if preferred, be fixed elsewhere.

When used on rail-way carriages, the axles of which revolve with the wheels, an endless screw, or toothed wheel, is formed, or placed, upon the middle of the axle, and from this, the motion is conveyed to the wheel work, in the manner, or upon the principles, hereinbefore specified.

The wheel work may be constructed in various ways; the number of the leaves upon the pinions, and of the teeth upon the wheels, being so calculated as to give the proper indication, as dependent upon the circumference of the wheel from which the motion is derived. This every competent workman is able to calculate, upon principles which do not require to be explained by me. I do not claim the application of wheels, pinions, or endless screws, to produce this effect, they having been already applied for a similar purpose; but having devised a combination of well known mechanical contrivances which is new in its application and arrangement, I consider myself as entitled to this special application and arrangement, which I shall therefore proceed to describe.

The plate upon which the distance traveled is indicated, I make oblong, as seen in fig. 2, and usually with four openings, behind which the dials, or plates, having the figures on them, revolve. The right hand opening shows eighths, or the fractional parts of miles, the next units, the next tens, and the next hundreds; these plates are seen at *m*, *m'*, *m''*, *m'''*. As they are made to revolve by a direct motion from their axes, they turn in opposite directions, and the figures shown are, therefore, upon two of them on the upper, and upon the other two on the lower, side of the wheel, as will be seen by inspecting the drawing. As it is requisite, or most convenient, to give to the wheels

an intermitting motion, I employ a kind of escapement wheel and pallet, well known in clock and watch work: *n* and *o*, figs. 1 and 3, show the construction of these wheels, *o* being the pallet, and *n* the wheel which it turns; the projecting part of the pallet taking into one of the notches, or teeth, in the wheel at each revolution: *n* in fig. 3 acts as a crown wheel, and in fig. 4 as a common flat wheel. The action throughout the index box is of this character; *p*, *p*, *p*, are spring checks. the use of which is apparent.

I will now give an example of the numbers on the wheels which will answer for a coach wheel of five feet in diameter, the usual size of the hind wheels of coaches as used in this country. I make the wheel or pinion *f*, of seven leaves; at, or near, the point where the rod enters the bottom of the carriage, I place a wheel and pallet *n o*, the wheel having six notches or teeth; the wheel of the first index plate *m*, has eight notches or teeth, and those of each of the others ten. The pinion *f* has seven leaves, and the thread of the endless screw *a* being single, the coach wheel will turn seven times whilst the pinion turns once. The wheel *n* has six teeth, and it will turn once, therefore, whilst the coach wheel turns 7×6, or 42 times. Now upon taking the circumference of a five foot wheel, with its tire, it will be found that 42 revolutions of such a wheel will carry it to a distance which is equal, as near as may be, to one-eighth of a mile, which is indicated by one revolution of the pallet *l*. The calculation for each of the other wheels being decimal, they are all made with the same number of teeth upon the wheels into which the pallets take, and with the exception of that on the arbor of the first plate, they are all flat wheels.

Fig. 4, shows the carriage and its body, with the accommodation rod, and nearly all the parts of the apparatus which appear externally, without the body of the carriage.

As it is necessary to secure the part of the apparatus within the cap from injury by dust, or otherwise, and at the same time to be able to open the cap with facility for the purpose of greasing the axle, I have devised a new mode of fastening the cap on to the end of the hoop, or barrel, of the hub, or nave; this I do by what is called a bayonet joint, having two or more pins projecting from the rim of the cap, which pass into notches on the hoop, and then turn at right angles, and lock; or otherwise I make a flanch, or rim, to project inwards from the edge of the hoop, and in this make two or more notches, which allow clips upon the cap to pass through, turn, and lock upon the flanch. In addition to their thus locking by pins, or clips, I place a spring bolt, or catch, which falls into a cavity within the box, and prevents its removal until the bolt, latch, or spring, is raised; which may be done by a nail or pin, passing through a small opening in the cap. Boxes of this description may be applied to all the wheels. The manner of making these may be seen in fig. 5, and will not require further explanation.

What I claim as my invention, and for which I ask a patent, is the carrying the motion, in the manner described, from the centre of the axle towards the body of the carriage; the employment of the

W. A. TURNER'S ODOMETER.

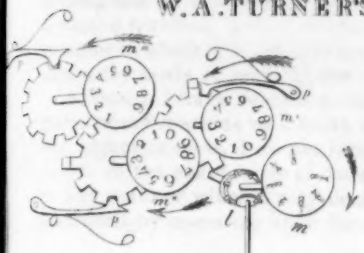


Fig. 2.

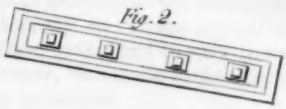


Fig. 3.

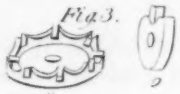


Fig. 1.

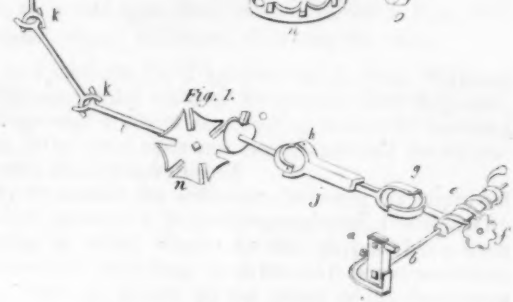


Fig. 4.

Fig. 5.

sliding rod for the purpose set forth; the giving the indication of the distance traveled, within the body of the carriage; and the general manner in which the parts are arranged for effecting this object. I also claim the mode of securing the caps upon the hubs of the wheels.

Although I have described such an arrangement of the respective parts of my machine as I think the best adapted to the attainment of the object in view, I do not intend thereby to confine myself in all points to the exact mode of construction given, but to vary the same in any manner which I may deem proper, whilst the same effects are produced by operating upon the same principle.

WILLIAM A. TURNER.

Specification of a patent for an improvement in Wheels for Cars and Locomotive Engines, to be used upon Rail-roads. Granted to ROSS WINANS, *Civil Engineer, city of Baltimore, November* 19, 1833.

To all whom it may concern, be it known, that I, Ross Winans, of the city of Baltimore, in the state of Maryland, Civil Engineer, have invented an improved mode of constructing wheels for cars and locomotive engines, to be used upon rail-roads, and that the following is a full and exact description thereof.

The more clearly to exhibit the difference between my improved wheel and those which have been heretofore employed, I will briefly point out the manner in which wheels for this purpose have been most commonly made; not intending, however, as it is not necessary for the purpose in view, to notice all the plans which have been adopted.

1st. Such wheels have been made wholly, or nearly so, of cast iron; the face, or tread of them, being cast within a *chill*, consisting of a thick rim, or hoop, of iron, which forms a part of the mould.

2nd. The wheels have been cast without being chilled, and afterwards hooped with wrought iron, which then forms the face and flanch of the wheel.

3d. A cast iron nave, or hub, has been made to receive wooden spokes, inserted in wooden felloes, which were hooped with a tire of wrought iron,

4th. The hubs have been of cast iron, with spokes of wrought iron, and a rim of wrought or of cast iron, hooped with wrought iron.

These plans have each their respective advantages and disadvantages, but neither of them has fully answered the purpose for which it has been adopted; the wrought iron hoop, or tire, upon the cast iron rims have gradually become loosened; the wooden spokes and felloes have pressed the one into the other, and the tire has ceased to bind them, an evil which wedging will not cure. To remedy these defects, and others incident to some of the wheels, is the object of my improvement.

My wheel consists essentially of three parts, namely, an *interior wheel*, the hub, spokes, and rim of which, are of cast iron; a *rim of wood*, formed in a way to be presently described, surrounding the

cast iron wheel; a *hoop, or tire, of wrought iron,* surrounding the wood, and forming the face, or tread, of the wheel.

The inner wheel is made, in some respects, like those first noticed, but the face is not chilled, nor has it the same form with the chilled face. It should be made of the same width on the rim, with the wrought iron tire which is to surround and form the tread of the wheel, say five inches. The face of the cast rim may be cylindrical for the greater part of its width, but it must in this case have a fillet, or edge, projecting up on each side of it, say to the height, and of the thickness, of half an inch, which will then give to it the appearance of a wheel with a double flanch, having a cylindrical tread of four inches in width. Instead of making the face in this form, I intend sometimes to give to it a regular declination from each edge towards the centre. A section of the rim, transversely, would then be somewhat in the form of the letter V, but with the angle obtuse. The inclination will be sufficient if the diameter at the centre of the rim is one inch less than that at the sides, or edges. Other forms may be given to the face of the rim, by which the object in view may be attained, namely, that of retaining the wooden rim in its place, without its allowing it to move out on either side.

A *rim of wood* is to be placed around this wheel, which may consist of any convenient number of pieces, fitted to each other, and to the face of the wheel. The grain of the wood is to cross the rim of the wheel, running parallel with its axis. These pieces may be fitted to the face of the wheel with great facility by driving them into a large hoop, running as a chuck in a lathe, by which means they may be turned to the form required; they may then be fastened on to the rim by wood screws, or otherwise, and turned thereon to receive the iron hoop or tire. The best thickness of this rim will be from two to four inches.

The *hoop, or tire, of wrought iron,* is to be made in the usual form, turned truly, and passed on over the wooden rim when expanded by heating it as highly as may be done without burning the wood. Bolts are then to be passed through the wrought iron, the wood, and the cast iron rims, which are secured by nuts, to confine the whole together.

The hub, or nave, in a wheel thus made, may be cast entire, instead of having those divisions, or openings, which are necessary in the chilled wheel, to allow for contraction. Although I have described the spokes and rim as being of cast iron, either or both of them may be of wrought iron, but it would be more costly, without affording any adequate advantages; those of cast iron being perfectly safe in this mode of construction.

It will be readily perceived that the wood, thus pressed between two hoops of iron, has an extent of bearing surface which will effectually prevent its being condensed by the force to which it is subjected; whilst, by its elasticity, it will tend to preserve both the road and the vehicles passing over it. If perfectly dried when put on, which may be done by artificial heat, the wood will never shrink, but on the contrary, will expand, and render all the parts the more firm. Such a wheel will have less tendency than any other, where wood

is employed, to get out of truth; and should wedging become necessary, it may be done more effectually than with any other.

The dimensions of most of the parts of such a wheel need not differ greatly from those of the cast iron wheels with chilled rims, but, like them, must vary according to their diameter, and the load they are to sustain; the following is a good proportion for wheels of three feet in diameter, intended for cars carrying three tons.

Cast iron interior wheel, twenty-nine inches diameter; hub seven inches long by six in diameter; spokes, twelve in number, five-eighths of an inch thick, and three and a half or four inches broad; rim five inches broad by five-eighths of an inch thick; wooden rim two and five-eighths inches thick, five inches deep, measuring across the rim; wrought iron tire seven-eighths of an inch thick, five inches broad, flanch one and one-fourth inch deep, one inch thick.

Although I have described the rim of wood as placed with its grain crossing the rim of the wheel, and am fully convinced that this is the best manner of placing it, yet it will answer the purpose, to a considerable extent, when running in the direction of the rim, and I do not intend, therefore, to limit myself in this respect, as what I claim as my invention is the interposing a rim or belt of wood between an interior wheel of cast or of wrought iron, and a wrought iron rim or tire, and securing the whole together in the manner, and for the purposes hereinbefore set forth.

Ross Winans.

Further notice respecting the obtaining of Patents in England.

The Editor has just received a further communication from W. Serrell, Esq. Engineer, New York, the gentleman referred to in the first article in the present number, in which he has furnished another extract from a letter on the subject of English patents, dated London, 17th February, 1834. As it not only confirms, but gives additional importance to the observations made in the above named article, we hasten to publish it.

"By the way, a man has recently arrived from New York, named S———, loaded with patents, none of which are his own; amongst them he has got J. R——'s, with the specification and drawings. R—— knows him, and S—— was much surprised to find R—— here, and still more that his patent was secured.

"This is another practical evidence of the importance of the caution which I lately sent to you, and which I hope you have had published. The moment a patent worth any thing is taken out at Washington, one of these kidnappers secures the child as his own, and goes away with it to a foreign market. A patent was recently named to an English tradesman, who directly asked if it was not an American invention; on being answered in the affirmative, he rejoined 'you are too late, my brother saw it in New York, and when he came home had one made.' The plain result of all this is, that when any thing is invented in America which is deemed worthy of being patented in

England, it ought to be secured, but not published in America, until time has been given to secure it in England. You may be assured that there are regular traders, or rather regular plunderers of patents, persons who make this a business, and do nothing else. I could furnish some proofs of the fact."

Mr. Serrell adds, "the first part of the above refers to a patent for an improvement, the inventor of which went hence by my advice, and applied to my friend in London, by whom he has been placed in a situation to obtain a handsome remuneration for his invention, all of which would have been jeopardized had S—— left New York a few weeks earlier. Any unprincipled man, with a small amount of mechanical knowledge, can, by swearing to 'a communication from a foreigner residing abroad,' obtain a patent, unless he is met on the threshold by an opposition which will compel him to show the nature of the communication under which he attempts to procure it.

"I forward the preceding extracts and remarks for publication in your Journal, should you think proper so to dispose of them."

The writer of the letter from England probably is not aware of the difference between the practice here, and there, in the issuing of patents. In England the patent issues upon the title of the invention being furnished, and several months are allowed, most commonly six, for the enrolling of the specification, so that no individual can learn the nature of the invention at the patent office, for this length of time after it has been *secured.* In the United States the specification must be furnished before the patent can issue, and the very day that a patentee receives it, any one may obtain a copy of it. The office has no power whatever to refuse such a copy, and no blame therefore, attaches there, this being the fair construction of the law. The only safe procedure, therefore, when an inventor wishes to secure a patent in England, is to send over prior to, or simultaneously with, his application here, furnishing to a proper agent, a copy of his specification and drawings, and the necessary funds, otherwise he is likely to be superseded, in which case he has no remedy.

There are but few cases, however, in which an inventor ought to rely upon his own judgment respecting the propriety of obtaining a patent in England; he should obtain the best advice here, and after this be careful that the business goes into the hands of an agent there who has the ability, and the integrity to direct him aright. An english patent costs about six hundred dollars, for that kingdom alone, and if extended to Scotland and Ireland, about three times that amount. Were all inventions as good as their authors think them, this sum would be one of little comparative moment; but, in point of fact, there is not more than one in fifty of the patents obtained here, which would be worth patenting in England, at so great a cost, although what is really new and useful will, in general, be better paid for there, than with us.

ENGLISH PATENTS.

To Robert W. Siever, *for an improvement or improvements in the making or manufacturing of Elastic Goods or Fabrics, applicable to various useful purposes. Sealed January* 17, 1833.

This invention is described by the patentee in the following manner:—

My invention of an improvement or improvements in the making or manufacturing of elastic goods, or fabrics, applicable to various useful purposes, are designed for the production of an elastic web, cloth, or other manufactured fabric, for bandages, and for such articles of dress as the same may be applicable to.

The first object which I propose, is to manufacture an article by the ordinary knitting frame, or similar kind of machinery, in which cords or strands of Indian rubber shall be introduced between the loops or stitches of the fabric, for the purpose of forming elastic cords or bands round the margins or other parts of stockings, socks, gloves, nightcaps, drawers, and various other articles of clothing. The second object is to manufacture in the ordinary loom an elastic woollen cloth, by the introduction of cords or strands of India rubber among the longitudinal threads or yarns which constitute the chain or warp, and also among the transverse threads or yarns, which constitute the weft or shoot, and which cloth shall be capable of being afterwards felted and dressed with a nap. The third object is to produce cloth from cotton, flax, or other suitable material not capable of felting, in which shall be interwoven elastic cords or strands of Indian rubber, coated or wound round with a filamentous material.

The first of these improvements I effect by preparing knitting frames, or other similar machines, in the usual way for the production of the knitted materials called stocking fabric; and when the same are set to work, and the fabric has been manufactured by the ordinary knitting process up to the part at which I desire to introduce the elastic cord or strands, I then, by the adjusting screws of the machine, provide for the elongation or contraction of the lengths of the loops or stitches of the row next to be produced across the machine, in order to form a channel to receive the said elastic cord or strand; and having prepared fine strips of Indian rubber, which may, if desired, be coated, or covered, with a filamentous material, as described in the specification of my patent, dated the first day of December, 1831, and enrolled in the Office of the Rolls Chapel of the High Court of Chancery, in June, 1832, I conduct such thread, cord, strand, or strip, of Indian rubber by means of a long needle, hook, pincers, or other suitable apparatus answering the purpose of a shuttle, across the machine between the row of stitches or loops which were last made, and those which are then about to be formed; and having drawn the said Indian rubber thread, cord, or strand, straight and smooth, I complete the last mentioned row of loops, or stitches, by the ordinary movements of the machine which encloses the Indian

rubber thread, cord, or strand, and keeps it securely in its place, interwoven with the threads of the fabric. A second thread of Indian rubber is in like manner introduced between the next or other subsequent row of stitches, and is in the same way confined; and any further number of these threads, cords, or strands, may, by the same means, be inserted and interwoven into the fabric at such parts as may be required for the purpose of producing (when the selvages are connected or whipped together) elastic bandages, garters, or bracings round the stocking, sock, glove, nightcap, or other article of wearing apparel.

In effecting the second improvement, the production of an elastic woollen cloth, I introduce into the loom among the longitudinal or warp threads or yarns of the intended fabric, longitudinal threads, cords, or strands of Indian rubber, or I constitute the warp entirely of such strands, either covered with a filamentous material or not, as before described; and through, or between the warp threads, cords, or strands of warp, I pass the transverse weft or shoot threads or yarns in the ordinary way of weaving, for the purpose of effecting that intervention which produces the cloth; these transverse weft threads being composed in part of the Indian rubber strands, or of the ordinary threads or yarns of the fabric, according as I may wish to produce a cloth which shall be elastic lengthwise only, or in both directions.

If the elastic cloth so produced should be intended for outward garments with a nap upon its surface, I should employ, in connexion with the India rubber strands, yarns spun from short wool, which, after having been woven, I should finish as the woollen cloths are usually finished, that is, felt the wool in the fulling stock, raise the pile by gig machinery, or by hand cards or teazles, and afterwards shear the nap down to a fine smooth surface. In manufacturing an elastic cloth from cotton, flax, or other material which is not intended to be milled or fulled, I introduce into the fabric threads or strands of Indian rubber, which have been previously covered by winding filaments tightly round them through the agency of an ordinary covering machine, or otherwise; these strands of Indian rubber being applied as warp or weft, or as both, according to the direction of the elasticity required. By thus combining the strands of Indian rubber with yarns of cotton, flax, or other non-elastic material, I am enabled to produce a cloth which shall afford any required degree of elastic pressure, according to the proportions of the elastic and non-elastic material.

It remains only to add, that the strands of Indian rubber are, in the first instance, stretched to their utmost tension, and rendered non-elastic, as described in my former specification; and being in that state introduced in the fabric, they acquire their elasticity by the application of heat after the fabric is made.

Lastly, as my invention consists solely in the employment of strands of Indian rubber in connexion with yarns, in the way described for manufacturing elastic goods or fabrics, I have not deemed it necessary to describe any particular kind of machinery for carry-

ing the same into effect, as such machinery is well known, and forms no part of my invention. [*Lond. Jour.*

To JOHN O. N. RUTTER, *Wine Merchant, for his invention of an improved process for generating heat, applicable to the heating of boilers and retorts, and to other purposes for which heat is required. Sealed March* 30, 1833.

The subject of this patent is the employment of bituminous, resinous, or oily matters in connexion with water as a combustible material, which, it is said, will produce a fuel for furnaces, boilers, &c., capable of giving out a very intense heat. Strange as the suggestion of applying water as a combustible material may appear, it is reported to have been found extremely advantageous, economical, and convenient. We, of our own knowledge, can say nothing upon the subject, but merely give the patentee's views and recommendations in reference to the manner in which he proposes to employ those materials for the production of heat.

Bituminous, oleaginous, resinous, waxy, or fatty substances are to be employed: as coal tar, which is to be combined with water in certain proportions. It is proposed that a stream of coal tar shall be allowed to flow from a reservoir through a pipe with a stop cock, and likewise a stream of water from another reservoir through a similar pipe; that the two streams shall meet, and fall into one general receiver with a funnel tube, by which they may be together delivered into the furnace.

The proportions are recommended to be one gallon of coal tar to one gallon and a half of water, the flow of the two liquors to be regulated by suitable apertures or stop cocks. These quantities of materials are to be slowly discharged from the funnels that the whole shall occupy from two to three hours in its delivery into the furnace; and where the furnace is of such magnitude as to require it, several of these funnel tubes may be employed, each delivering its supply of materials in the proportions and times stated.

It is not necessary to use water in a pure state, to be mixed with the coal tar, as foul water will answer the purpose equally well; and on shipboard, where the invention may be usefully applied to steam navigation, the bilge water from below, or sea water, may be pumped up and employed for the purpose, and on land the ammoniacal liquor from gas works will also suit as well as fresh water. [*Ibid.*

To ANDREW URE, *M. D., for his invention of an improved apparatus for evaporating sirops and saccharine juices, which is also applicable to other purposes. Sealed June* 20, 1832.

I, the said Andrew Ure, do hereby declare the nature of my said invention for evaporating sirops and saccharine juices, which is applicable also to other purposes, to be a chemical apparatus, wherein

certain chemical menstrua are made to serve as agents for regulating and modifying the operation of caloric or heat upon various forms of matter, and whereby the influence of high temperatures on these forms of matter may be obtained in definite degrees without the accidents and dangers to which steam and oil as media of heat are liable. This combination of chemical menstrua, with suitable vessels for containing and applying them, I denominate my improved apparatus.

First, I fix one pan within another, so as to leave an intermediate space between the two pans, into which space I put my hot bath liquid medium, consisting of a strong solution of caustic potash, or caustic soda, or of a mixture of these two alkalies. The purer the said simple or compound alkaline solution is, so much the better, but it will form a good calorific medium though it may contain a little carbonated alkali, neutra-saline matter, or other impurity. When the inner pan has the surface of its bottom, or of its bottom and sides, amplified by corrugation with angular or curvilinear ridges and furrows, it constitutes the form of the double pan apparatus, which I prefer for evaporating sirops, saccharine juices, and, in general, all liquids which require to be heated under a regulated temperature, or are injured by exposure in a single pan to the heat of a naked fire.

A double pan of this kind, covered with a proper capital, will constitute an excellent alembic for the distillation of fermented worts or wash, especially those containing rye. The bath space of the said double pan should be provided with a safety tube for discharging any redundant steam which may occasionally proceed from the medium by undue firing. The upper extremity of this tube should terminate in a water trap, or water valve, so as to cut off the open communication between the bath and the atmosphere, because the carbonic acid in the air would eventually carbonate the alkaline solution, and impair its properties as a liquid bath medium.

To each double bath pan I attach one or more thermometers, having their bulbs plunged into the medium, in order to show its temperature; and as the boiling temperature of the alkaline solution depends upon its states of dilution, I regulate that temperature by introducing a little water into the bottom, or centre, of the bath, (through a perforated hole) plunged into it, and connected at its top with a funnel or cistern of any kind.

To insure permanency to the constitution of the alkaline bath, the water valve, or water trap cistern, attached to the end of the safety pipe above specified, should be charged with water mixed with lime, kept in a milky state by occasional agitation.

The said medium may also be applied to evaporation, to oven heating, and to other purposes where a definite temperature is wanted, by heating the alkaline solution in a separate vessel, and causing it to circulate through tubes or cases, of any suitable form, for the communication and distribution of the calorific energy.

The said separate vessel should be connected with a safety pipe, and furnished with a thermometer, and with a tube for supplying water of dilution when needed to regulate the temperature.

I also propose, in certain cases, to employ sulphuric or phosphoric acid, either alone or mixed, as hot bath mediums, the vessel and conduits containing these liquid acids being made of a substance not corrodible by them, and furnished with safety tubes, thermometers, and water supplying pipes for dilution.

I claim as my invention, 1st. the application of a strong solution of caustic alkali, as a bath to an evaporating pan or still, with a corrugated bottom; 2nd. I claim the use for the said alkaline caloric medium of a water trap cistern charged with milk of lime, attached to the end of the safety steam pipe; 3d. I claim the application of the said alkaline solution, either as a bath to the external surface of a plain pan, or as conducted from a boiler through pipes and conduits, in order to apply regulated heat to various purposes; 4th. I claim the application of sulphuric and phosphoric acids, or mixtures of them, as baths or mediums for transmitting heat at definite temperatures.

[*Ibid.*

Specification of the Patent granted to FRANCOIS C. JACQUEMART, *Esquire, for Improvements in Tanning certain descriptions of Skins. Communicated by a certain Foreigner residing abroad. Sealed October* 20, 1830.*

To all to whom these presents shall come, &c. &c. Now know ye, that in compliance with said proviso, I, the said Francois Constant Jacquemart, do hereby describe the manner in which my said invention is to be performed by the following description thereof, that is to say:—

The invention relates to the manner of tanning, preparing, and dressing hares, cats, rabbits, and sea rats' skins, and rendering them fit, through the medium of various preparations mentioned hereafter, to make boots, shoes, gloves, and any other leather goods, little if any advantage having hitherto been obtained from hares, cats, rabbits', and other small skins. All those skins were nearly or entirely lost for the leather trade, since, having cut the hair off, they were only used to make glue or other similar purposes. Having examined the nature of such skins, and submitted them to certain preparations, the inventor has succeeded, after many attempts, to give them the necessary strength and consistency, in such a way as to employ them with advantage in making boots, shoes, gloves, and other leather goods.

First, I proceed as follows: Take the skins; lay them open; pull off the long hair; rub them with mercurial aquafortis, and put them into a heat of about forty-five or fifty degrees by Reaumur's thermometer. I then cut the hair off, and then take these skins stript of their hair, lay them in the tan preparations. When they have been

* An abstract of this specification was given in a former number; it is now published entire, and however good the process may be, the description is certainlly a very bad one.

dried so high as forty-five or fifty degrees, in order to bring them again in their natural state, I put them into salt water mixed with blood for about six or seven days. Afterwards take them out of it, to put them into a water mixed with blood in the proportion of about one-tenth part of blood to nine-tenth parts of water, to get the salt out, and deaden or render them supple. Remove them from that ley, and put them into a dead lime water, to cause them to swell or thicken, and put them again for three days into a lime water stronger than the former, to obtain a greater swelling or thickening. To succeed in it, I take one pound of salt pot-ash and eight ounces of orpiment, that I melt together for one hundred skins. Then I throw them into a lime bath about one-fifth stronger than the former ones, and leave the whole for twenty-four hours; after which the hair will drop off perfectly.

Manner of tanning the same skins.—I take away the hair from them, and remove the loose flesh. I have a set of tubs placed upon each other; I fill them with tan; wash them in ley, in order to get the clear liquid out springing from the tan. I then lay upon each tub about one pound of sulphuric acid. When this liquid has reached four degrees in strength, I take out the skins every other day, change them, and replace them in the same liquid till they are nearly tanned. Then I lay the skins in the pit for about one month, after which the skins become much stronger. The currying of them is done like that of other skins, and those reserved for glove making are dressed in the same manner as the white skins for that use.

Second process.—I take the skins, lay them open, pull off the long hair, steep them in a bucket of clear water, and give them the first dressing. I put them again in the same water during twenty-four hours, take some lime, infuse it, and add to it, for one hundred skins, four ounces of orpiment, which I mix with the lime. I then lay some lime upon each, on the side of the flesh, to make the hair drop off, and pick or remove the loose flesh off; on the fleshy side, in a contrary way to the grain of the hair, to get off the inner skin. I put them then into a new lime water; add to this lime water, for one hundred skins, two pounds of alum, and one pound of salt pot-ash, the whole dissolved together. I let the skins remain in the lime-water for the space of eight days; take them out of the lime-water, and dress them every day; wash them thoroughly, put them into a vessel with the tan, and stir or agitate them four or five hours every day; let them remain therein about five or six days. Afterwards, I put them into a vessel with new tan, and add to it, for one hundred skins, eight ounces of sulphuric acid. I let them remain in this fresh vessel a necessary time to get the strength and thickness which are wanted, which is obtained in about twenty-four or thirty hours. I take them out of it, put them into a tan-pit or vessel, and lay some tan between the skins in order to soak them. I take the liquid out of the tan, and mix with it, for one hundred skins, one pound of alum. I let them remain thus for eight days; take them out of it, and lay them in the pit, and let them remain there about a month. I again take them out of it, and curry them like the other skins. The skins

for glove-making are dressed in the same manner as the white skins for that use.

My manner of tanning, preparing, and dressing these skins as fur-skins, so that the hair may not fall off, or the moth or mite get into them (these leather furs being thick, strong, and supple, may be employed in making boots, shoes, gloves, and other articles,) and have not besides the inconvenience of the furs called untanned furs. I take the skins, lay them open, pull off the long hair, steep them afterwards in clean water; at the end of twenty-four hours give them the first dressing; put them again into the same clean water for twenty-four hours; take one pound of alum for twenty-five skins; melt it in lukewarm water, and pour that water into a bucket. Then I take the skins, one by one, and dip them in the same water of alum. Let them remain in it for two days afterwards; melt some quick lime in water, and let it get cool. I then take the skins out of the water of alum, and put them into this quick-lime water. Five or six days afterwards I take them out of the lime-water, put them into clean water, and immediately wash them thoroughly. I then tan, curry, or chamois them in the way before described.—*Rep. Pat. Inv.*

¶ *Statistics of French Manufacturers.*

"The principal manufactures of France may be dated from the reign of Louis XIV., whose minister, the celebrated Colbert, invited foreign artists and artisans of every kind and of distinguished merit into the kingdom, and encouraged them by premiums to fix their establishments in France. But towards the end of his reign, that monarch, by his revocation of the Edict of Nantes, and his persecution of the Protestants, in a great measure destroyed the advantages arising from the foreign establishments, by forcing thousands of artisans to seek refuge in England and the Low Countries, into which they introduced those branches of industry, especially silk. Thus France lost the services of some of her most ingenious mechanics through the folly of an infatuated monarch.

"To give an idea of the manufactories of France, it is sufficient to cite the draperies of Louviers, Sedan, Elbeuf, Castres; the cambrics of Valenciennes and Cambray; the pier-glasses of St. Gobain, whose dimensions are occasionally ten feet in height by four and five feet broad; the cotton manufactories of St. Quentin, Rouen, &c. &c.; the linens of Brittany, Dauphiny, and the northern provinces; the laces of Lille, Alençon, Valenciennes, and Puy; the silks of Lyons, Avignon, Nimes and Tours; the tapestries of the Gobelins, at Paris; the carpets of La Savonnerie and Aubusson, which, in beauty of design and brilliancy of colours, rival those of the east; the porcelain of Sevres, her manufactories of clocks and watches, jewellery, crystal, mock diamonds, bronzes, fire-arms, &c. To these might be added an immense number of manufactories which were wholly unknown in France half a century ago, such as files, needles, wool-cards, &c.

"We have learned from official sources, that the capital employed

in manufactures amounts to 1,820,105,409 fr., which is applied as follows:—

In indigenous materials	416,000,000 fr.
In materials imported	186,000,000
In wages	844,000,000
In general expenses, as wear and tear of machinery and tools, repairs, fuel, lights, interest of money invested as fixed capital, which being deducted from the gross amount, leaves 182,105,409 fr. for the profit of the manufacturers	192,000,000

"The annual produce of the principal branches of industry in 1828 has been calculated in round numbers as follows:—

Thrown silks, silk stuffs, gauzes and crapes	160,000,000 fr.
Cloths and woollen stuffs	250,000,000
Linen drapery and thread lace	210,000,000
Stationary	25,000,000
Cotton	200,000,000
Lace	10,000,000
Hardware	125,000,000
Coal and other produce of mines and quarries	30,000,000
Watches and clocks	30,000,000
Gold and Silver articles	50,000,000
Jewellery	40,000,000
Glass, plate glass, china, pottery, bricks	80,000,000
Lime and plaster	15,000,000
Salts and acids	30,000,000
Soap	30,000,000
Refined Sugar	15,000,000
Hats	30,000,000
Leather	160,000,000
Dye and varnish	50,000,000
Perfumery	15,000,000
Books	30,000,000
Beer	60,000,000
Cider and perry	50,000,000
Brandy	75,000,000
Upholstery and musical instruments	50,000,000
Total,	1,820,000,000 fr.

"Having enumerated the principal manufactures in France, we shall state from official information the progress made in the productions of those manufactories from 1812 to 1827. In the first place, we find that under the government of the empire, when Belgium and the left bank of the Rhine were under her dominion, France in 1812 employed in her manufactories 35 millions kilogrammes, or 70 million lbs. of native wool. In 1816, the quantity of native wool, with the amount imported of foreign wool for fine cloths, merinos, and cachemires, &c., was in the whole 80 million French pounds, which, with the difference of nearly ten per cent,, is equal to 90 million lbs.

English. In 1824 and 1826, the quantity of wool used in the manufactories amounted to 48 millions of kilogrammes, making an increase in the consumption of wool, in fourteen years, of 26 millions of French pounds, or more than one million English tod.

"In 1812, the quantity of cotton spun into thread did not exceed 10,362,000 kilogrammes. The consumption in 1816 amounted to 12 millions of kilogrammes; in 1825, the quantity manufactured was 26 millions; in 1826, 32 million kilogrammes of cotton employed in prints, calicoes, tulles, &c.: thus the consumption has been more than tripled in fourteen years. The consumption of silk has not less increased, in proportion to wool and cotton. In 1816, France imported 400,000 kilogrammes of silk; in 1824 and 1825, 650,000 kilogrammes; and in 1826, not less than 800,000 kilogrammes, notwithstanding the progress made and encouragement given to breeding of silk-worms in the country. In 1816, the quantity of coals extracted from the mines did not exceed 1000 million kilogrammes; in 1826, they furnished 1500 million kilogrammes. In 1814 and 1816, the quantity of iron manufactured amounted to 100 millions, and in 1825 and 1826, it had increased to 160 millions of kilogrammes."—[*Goldsmith's Statistics of France, and Rep. Pat. Inv.*

¶ *Correct Fusing Points of Metals and Alloys, and other important temperatures upon various Thermometrical Scales.*

In the thirteenth edition of Parke's Chemical Catechism, edited by Mr. Braley, jr., which has just appeared, we find a "Table of the Effects of Heat" (p. 606,) in which the higher temperatures have been corrected by the Editor, agreeably to the pyrometric researches of Mr. Daniell and other chemists. As we do not remember to have seen any connected view of the results, as to the correct fusing points of metals and alloys, &c., which Mr. Daniell has obtained by the use of his new register pyrometer, we subjoin an extract from this table, containing the temperatures from 212° upwards. It may be requisite to state, for the information of such of our readers as may not be acquainted with the present state of pyrometry, that Mr. Daniell has shown (as we find it explained by Mr. Braley at p. 70, *notes*, of the Chemical Catechism,) that "the degrees (above the zero of 1077° Fahrenheit, which is stated to be a red heat visible in the daylight,) of Wedgwood's pyrometer, instead of being equal to 130° of Fahrenheit, as supposed by its inventor, are equal only to about 20°;" and that consequently the *range* of that instrument, instead of including 3200 degrees of Fahrenheit, did not really include more than about 5000°: this will account for the great difference of the corresponding temperatures of Fahrenheit, &c. and Wedgwood, as here stated from the new edition of the Chemical Catechism, from those given in former editions of that work, and also in many other publications on chemical subjects.

Fusing Points, &c. on the Scales of	Fahr.	Reaum.	Cent.	Wedg.
Water boils, and 'fusible metal' [$\frac{8}{16}$ bismuth, $\frac{5}{16}$ lead, $\frac{3}{16}$ tin, melts,]	212	80	100	
Sulphur melts	216	89	111	
Nitrous acid boils	242	93	116	
Camphor melts	288	114	142	
Sulphur burns slowly	303	120	150	
Pewter melts, lead $\frac{4}{5}$, tin $\frac{1}{5}$	403	165	206	
Tin melts	442	182	227	
Type metal melts, (lead 16 parts, antimony 1)	507	211	264	
Sulphuric acid (Sp. gr. 1.848) boils	590	248	310	
Lead melts	612	258	325	
Mercury boils	662	280	350	
Zinc melts	773	329	412	
Iron a bright red in the dark	800	341	427	
Hydrogen gas burns?				
Iron red in the twilight	884	386	475	
—— red heat in daylight	1272	551	700	
Enamel colours *burnt or burnt in*,* on porcelain	1392	605	756	6
Bronze melts, copper $\frac{3}{4}$, tin $\frac{1}{4}$	1446	629	786	
——, copper $\frac{7}{8}$, tin $\frac{1}{8}$	1534	668	835	
Diamond burns?	1552	676	845	14
'Orange heat' (Prinsep)	1650	719	899	
Brass melts, copper $\frac{1}{2}$, zinc $\frac{1}{2}$	1672	730	911	
——, copper $\frac{3}{4}$, zinc $\frac{1}{4}$	1690	737	921	21
Bronze melts, copper $\frac{15}{16}$, tin $\frac{1}{16}$	1750	794	955	
Silver melts	1873	818	1023	28
Copper melts	1996	862	1091	
Gold melts	2017	860	1102	
Delft ware fired	2072	967	1179	40
Cast iron melts	2786	1224	1420	
Cream coloured stone ware fired	2992	1316	1645	86
Temperature of the maximum of expansion of platinum, being nearly the highest degree of heat attainable in a laboratory wind furnace	3280	1444	1805	
Flint glass furnace, greatest heat?	3552	1253	1956	114
Soft iron melts, according to Clement and Desormes, but in all probability an estimate considerably above the truth	3945	1406	2118	

* This is a technical term used by enamellers, glass and porcelain painters, &c., to denote the fixing of the colours they employ, by means of vitrifaction, on the substances painted upon.

Mr. Braley observes at the end of the table, "The still higher temperatures, derived from the experiments of Mr. Wedgwood, which were here given in former editions of the Chemical Catechism, are now omitted; a comparison of them with the results obtained by Mr. Daniell, by means of his pyrometer, having shown that they cannot be relied upon. Some of the temperatures given in this table above that of ignition, or 800°, must also be regarded as doubtful, and all of them must be regarded as approximate merely.

[*Rep. Pat. Inv.*

Attempt to assign the cause of the Spontaneous Combustion of Charcoal. By Mr. John Davies. *Member of the Wernerian Society of Edinburgh, &c. and Lecturer on Chemistry, &c.*

In the above interesting paper*, no attempt has been made by the author of it to furnish an explanation of the phenomenon which he has established and described: and as every inquiring mind will direct its attention to a rationale of the operation, I presume that some remarks which have occurred to me within the few last days, and which may at least supply some aid in the discussion, may be, without impropriety, appended to the paper. These remarks, though theoretical, are countenanced by experimental analogies, which, if they fail to establish the accuracy of the speculation, may at least excuse its introduction.

A statement of the mode in which the charcoal in question is made, will be necessary in the subsequent explanation. Small fragments of wood, generally stripped of their bark, are put into iron cylinders, and exposed to intense heat in order to effect the distillation of the volatile constituents for the manufacture of iron liquor. Now, Mr. Brunner resorted to a similar procedure in obtaining potassium from potash and charcoal; and as we know that potash may be procured from the wood employed by Mr. Hadfield, we have in his manufacture the same operation and the same materials as in M. Brunner's experiment, and may therefore expect the same results. The only difference would be, that as M. Brunner used much potash, he procured a large proportion of the metallic base; while in the other case the potassium must be in small quantity, because all the potash present would be only that supplied by the wood subjected to distillation: and yet, upon the whole, the quantity extracted under the latter circumstances is not inconsiderable; for it is by the combustion of such wood in America, where it is of comparatively little value, that the potash is principally formed which is consumed in the arts and manufactures in every part of Europe.

It is manifest, therefore, that in the formation of Mr. Hadfield's charcoal, potassium must, in small quantities, be liberated.

Supposing the presence of potassium in fresh charcoal to have been

* See page 208 of this Journal.

established, we have now to explain its operation; and this appears to be effected upon the assumption that the metal lingers in the pores of the charcoal, incased, as it were, in the substance, until it be at length exposed to the action of atmospheric air and aqueous vapour. This view of the subject derives plausibility from the facts, that the combustion does not commence at any considerable depth below the surface; and that when a thermometer is introduced into the mass, the ignition generally originates in that place; that is to say, the combustion occurs exactly where it might be expected, since it takes place at the part which, favourably situated, is most exposed to the action of the supporter of combustion.

This general view of the spontaneous combustion is directly countenanced by the excellent paper of Colonel Aubert, inserted in the 'Bulletin des Sciences Militaires' for January, which Mr. Hadfield has afforded me the opportunity of consulting. This ingenious foreigner shows by a number of decisive experiments, that the absorption of air and moisture is indispensable in the production of the phenomenon.* He proves also, (what Mr. Hadfield has in a different way very clearly confirmed,) that no carbonic acid is formed before the incandescence occurs—a fact strictly in accordance with the hypothesis which I have offered; since upon this hypothesis the oxygen of the air, instead of forming an acid with the carbon, produces, by its superior affinity, an alkali with the potassium. The next position which he establishes, is, that the carbon increased in weight in proportion to the quantity of air and moisture absorbed; and this should, according to the explanation suggested, occur, the alkali formed being much heavier than its metallic base. It appears that, to produce the ignition, the charcoal should not only be reduced to powder soon after its formation, but that the sooner it is so reduced the more certain and considerable will be the effect. Now this fact also is entirely consistent with the explanation; because, when the pulverization has been delayed, air and moisture will have gradually produced the alkali, by a process imperceptible, because, the minute portions of potassium would be at comparatively distant intervals from each other, and thus would not be in sufficient quantity at any one place to produce a sensible effect.

Colonel Aubert pulverized a mixture of charcoal and sulphur, and he found that, under these circumstances, no ignition ever occurred. The reason is obvious: for the potassium which has been conceived to be the cause of the combustion, entered, during the trituration, into combination with the sulphur.

He also triturated charcoal with nitre, and he again found that the spontaneous combustion was prevented. Now nitre, by mingling with the potassium, would check its too rapid absorption of oxygen; and the effect of his experiment is in this way sufficiently accounted for.

The presence of the potassium seems to account for the circumstance, that when charcoal is moistened and subjected to heat, car-

* See Phil. Mag. and Annals, N. S. vol. ix. p. 148.

buretted hydrogen is set at liberty. In this instance it would appear that the water is decomposed, the hydrogen evolved, and the oxygen united with the potassium to form the alkali. If the heat be continued, carbonic oxide would be evolved; the oxygen absorbed in the first part of the operation being again detached from the metallic base. Now this explanation corresponds precisely, I believe, with the order in which, in such an experiment, these gases are produced.

All the circumstances observed by Mr. Hadfield and Colonel Aubert appear therefore perfectly reconcileable with the supposition, that the spontaneous incandescence is owing entirely to the oxidation of the potassium liberated from the wood during the manufacture of the charcoal.

Dr. Thompson, in the second volume of his History of Chemistry, published since my paper was read to our Society, has thrown additional plausibility upon my explanation, by his attempt to show that phosphorus owes its property of catching fire, when in contact with oxygen, to a little potassium which is reduced to the metallic state during the formation of the phosphorus. [*Phil. Mag.*

¶ *Composition and specific gravity of different kinds of Glass, and true nature of that substance in general.*

Ordinary flint glass, according to Mr. Faraday's analysis, consists in 100 parts, of silica 51.93, oxide of lead 33.28, potash 13.77, with minute portions of other substances. A specimen of the same kind of glass, manufactured for telescopes by the late M. Guinand, yielded the same chemist, silica 44.3, oxide of lead 43.05, and potash 11.75. Mr. Faraday found the specific gravity of M. Guinand's glass to be about 3.616, that of ordinary flint glass 3.290, that of plate glass 2.5257, and that of crown glass 2.5448.

Glass has usually been considered, without much actual inquiry into the subject, to be strictly a chemical combination of its ingredients, and in all respects a very perfect artificial compound. This, however, is far from being the truth, as will appear from the following facts. That the alkali in common glass of all kinds is in a very imperfect state of combination, many circumstances concur to evince. For example, Mr. Griffiths has shown that if a small quantity either of flint glass or of plate glass be very finely pulverized in an agate mortar, then placed upon a piece of turmeric paper, and moistened with a drop of pure water, strong indications of free alkali will be obtained; and that if the pulverization be very perfect the alkali can be detected in other kinds of glass, containing far smaller quantities of it. This proves that in whatever state of combination the alkali may be, it is still subject to the action of moisture. That flint glass is by no means a compound resulting from very strong chemical affinities, and that the oxide of lead which it contains is as imperfectly combined as the alkali, has been shown experimentally by Mr. Faraday, and also appears from the tarnish which is produced on its

surface by exposure to sulphuretted vapours, owing to the combination of sulphur with the lead. Glass which has long been exposed to the weather, frequently exhibits a beautiful iridescent appearance, and is so far decayed that it may be scratched with the nail. The glass of some bottles of wine which had lain in a wet cellar near the Bank of London upwards of 150 years, examined by Mr. Brande, was soft, and greatly corroded upon the surface, in consequence of the partial abstraction of the alkali. After reciting some of these facts, and others of a similar description, Mr. Faraday observes,—"Glass may be considered rather as a solution of different substances one in another, than as a strong chemical compound; and it owes its power of resisting [chemical] agents generally to its perfectly compact state, and the existence of an insoluble and unchangeable film of silica or highly silicated matter upon its surface.—*Parke's Chemical Catechism by Braley*, p. 128, 127. [*Rep. Pat. Inv.*

¶ *Iron Stone of Sussex.*

This substance was formerly extracted from the ferruginous sand stone strata; it is internally of a dark steel gray, and generally very hard and compact; occasionally it is laminated, and separates into thin flakes upon exposure to the air. It occurs either in irregular concretions in the sand (of the Hastings' Sand formation of geologists, formerly called the Iron Sand,) or it is stratified and alternates with beds of sand stone. The globular masses often contain nodules of argillaceous earth, round which the iron stone is disposed in concentric layers. In some parts of the county the iron stone is of excellent quality, and extensive foundries were anciently established in different parts of its course; 'the almost inexhaustible quantity of wood,' we are informed in Dallaway's Western Sussex,' with which the country was covered in the early centuries, and the numerous lakes and morasses which the total neglect of drainage had occasioned, being circumstances peculiarly favourable for the conversion of the iron ore into bars. For this purpose the lords of the several manors which lay within the woodland district, collected the rivulets into large ponds, and erected mills and furnaces. The iron so procured, was at first principally used for agricultural implements; but Fuller also observes in his Worthies, that 'it is almost incredible how many great guns were made of the iron of this county.' The total decline of the manufacture in Sussex is to be attributed to the establishments in Scotland and Wales, in which pit coal is used, the superior cheapness of fuel having enabled them to monopolize the trade. There is now but a single foundry in the eastern division, and which belongs to the Earl of Ashburnham. According to the present practice it requires fifty loads of charcoal, and fifty loads of iron stone, (twelve bushels to each load,) to make thirteen tons of pig iron.—*Mantell's Geology of the South East of England.*

[*Ibid.*

¶ *Force of Traction.*

Experiments uniformly show, that the force of traction is, in every case, nearly in an exact proportion to the strength and hardness of a road. The following are the results: on a well-made pavement, the power required to draw a wagon is 33 lbs., on a road made with six inches of broken stone of great hardness, laid on a foundation of large stones, set in the form of a pavement, is 46 lbs.; on a road made with a thick coating of broken stone, laid on earth, the power required is 65 lbs.; and on a road made with a thick coating of gravel, laid on earth, the power required is 147 lbs.—Thus it appears, that the results of actual experiments fully correspond with those deduced from the laws of science."

[*Parnell's Treatise on Roads.*

CELESTIAL PHENOMENA, FOR JUNE, 1834.
Calculated by S. C. Walker.

D.	H.	M.	S.								
5	3			☿	☌	ε	Geminor	✳	North	44′	
18	16	34		♀	☌	☾		♀	North	1′	
12	0			♀	☌	δ	Geminor	✳	South	1°.7	
8	16	26	58.2	Im.		♃	2 Sat.				
12	14	21	56.2	Im.		♃	1 Sat.				
19	16	16	09.2	Im.		♃	1 Sat.				
20	14	39	28.4	Em.		♃	3 Sat.				
27	16	30	40.7	Im.		♃	3 Sat.				
12	9	23		Im.	46	*i*	Leonis,		,6,	N158°	V210°
12	10	4		Em.						236°	288°
16	6	43		Im.	(270)		Virginis		,7,	208°	21°
16	7	56		Em.						220°	233°
16	11	8		Im.	94		Virginis		,5,	193°	227°
16	11	32		Em.						229°	269°
20	12	7		Im.	5	*i*	Sagittarii		,7,	134°	142°
20	13	17		Em.						242°	260°
20	13	45		Im.	7	*a*	Sagittarii		,6,	136°	159°
20	14	35		Em.						226°	256°
20	14	10		Im.	9		Sagittarii		,6,7,	120°	145°
20	15	18		Em.						242°	277°
20	14	52		Im.	(342)		Sagittarii		,7,	112°	136°
20	16	05		Em.						250°	282°
21	13	10		Im.	(261)		Sagittarii		,6,7,	111°	116°
21	14	30		Em.						253°	273°
21	16	44		Im.	(301)		Sagittarii		,7,	170°	210°
21	17	51		Em.						208°	255°
24	9	17		Im.		*k*	Capricorni		,5,	138°	99°
24	10	17		Em.						246°	215°
27	10	51		Im.		*s*	Piscium		,5,	115°	76°
27	11	54		Em.						303°	261°

The Chinese Wall.

According to a statement in the "Morgenblatt," the celebrated Chinese wall was erected 213 years before the birth of Christ, against the Mongolese. It is 714 German miles long, 14 feet thick, and 26 feet high; so that with the same materials, a wall, one foot in thickness and 23 in height, might be carried twice round the whole world.

Meteorological Observations for March, 1834.

Moon.	Days.	Therm. Sun rise.	Therm. 2 P.M.	Barometer. Sun rise.	Barometer. 2 P.M.	Wind. Direction.	Wind. Force.	Water fallen in rain.	State of the weather, and Remarks.
				Inches	Inches			Inches.	
☽	1	30°	49°	29.73	29.60	W.	Moderate.		Clear day.
	2	32	43	.56	.50	W.	do.		Clear day.
	3	33	50	30.05	30.15	NW.	Blustering		Clear day.
	4	28	45	.15	.10	W.	do.		Clear day.
	5	29	53	.00	.00	SW.	Moderate.	0.20	Clear—hazy—rain in the night.
	6	45	52	29.90	29.80	W.	do.		Cloudy—flying clouds.
	7	40	55	30.15	30.20	SE.	Blustering		Clear—hazy.
	8	50	64	29.85	29.70	SE. S.	do.		Cloudy day.
	9	34	42	30.15	30.25	NW.	Moderate.		Clear day.
	10	25	39	.50	.50	SE.	do.		Clear day.
☒	11	34	44	.20	.00	W. S.	do.	0.30	Cloudy—drizzle.
	12	40	56	29.96	29.74	W.	Blustering		Clear—flying clouds.
	13	34	46	30.05	30.00	W.	Moderate.		Clear day.
	14	32	60	.10	29.95	SE. NE.	do.	0.30	Lightly cldy—clear—rain in n't.
	15	32	42	29.80	.80	N. NE.	do.		Cloudy day.
	16	36	50	30.00	30.05	SE. S.	do.		Clear day.
	17	34	54	.05	.05	W.	do.		Clear day.
	18	48	58	.20	.10	E.	do.		Cloudy day.
☾	19	46	68	29.90	29.90	SW.	Brisk.		Clear day.
	20	50	70	.00	.75	SW.	do.		Clear day.
	21	40	70	29.90	.80	W.	do.		Clear—cloudy.
	22	41	72	.75	.80	W.	Blustering		Clear day.
	23	31	42	30.00	.85	W.	Moderate.		Cloudy day.
	24	36	56	29.75	.85	W.	do.		Cloudy—flying clouds.
	25	34	49	.75	.75	W.	do.	0.75	Cloudy—rain.
	26	31	41	.85	.60	SE.	do.		Clear—lightly cloudy.
⊕	27	32	40	.90	.95	W.	do.		Clear—flying clouds.
	28	30	51	30.12	30.12	SE.	do.		Clear—flying clouds.
	29	26	58	.12	.05	SW.	do.		Foggy—clear.
	30	44	64	29.84	29.64	W. S.	Brisk.		Clear day.
	31	24	35	.95	30.00	NW.	do.		Clear day.
☽		23	46	30.20	.20	SE. SW.	do.		Clear day.
Mean		34.61	12.68	29.95	29.94			1.45	

Thermometer.			Barometer.
Maximum height during the month,		70. on 20th.	30.50 on 10th.
Minimum	do.	21. on 22nd.	29.50 on 2nd.
Mean	do.	41.64	29.96